IOLINE SIGNATURE5000 Plotter/Cutter

Service Manual

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1

OVERVIEW

This manual will explain the testing and replacement procedures for the Ioline Signature5000 mechanical, electrical, and electronic subsystems. You will learn how to isolate mechanical and electrical subsystem failures to the assembly level and how to replace failed assemblies. You will also learn how to isolate electronic subsystem failures to the circuit board level and how to replace failed circuit boards.

Before you go to the Quick Start Testing and Replacement Procedures that are explained in Chapter Three of this manual, please read the safety guidelines that are explained below. Also refer to the Troubleshooting Guide in Chapter Two of this manual.

A BRIEF DESCRIPTION OF THE SIGNATURE5000

The Ioline Signature5000 is an open architecture platform that you can use for a variety of applications. The Signature5000 comes configured as a pen plotter, but with the addition of the optionally available tangential cutter you can convert it to a state-of-the-art sign maker.

The Signature5000 as a Pen Plotter

As a pen plotter the Signature5000 comes configured with a pen holder jaw connected to the pen lift plate. A variety of pens can be inserted into the pen holder jaw.

The Signature5000 as a Sign Cutter

As a sign cutter the Signature5000 comes configured with an optionally available tangential cutter connected to the pen lift plate. A variety of cutter blades can be inserted into the tangential cutter.

HOW THE SIGNATURE5000 WORKS

The Signature5000 enables movement of an attached tool along two axes, the X-axis (media movement) and the Y-axis (tool movement). The Signature5000 grit shaft and chart wheels produce X-axis motion by moving the media beneath the carriage. The carriage moves along the Y-axis on the traverse rods and can accommodate a variety of tool attachments. Tools are connected directly to the pen lift plate. This plate moves vertically, independent of X-axis or Y-axis movement (see Figure 1-1).

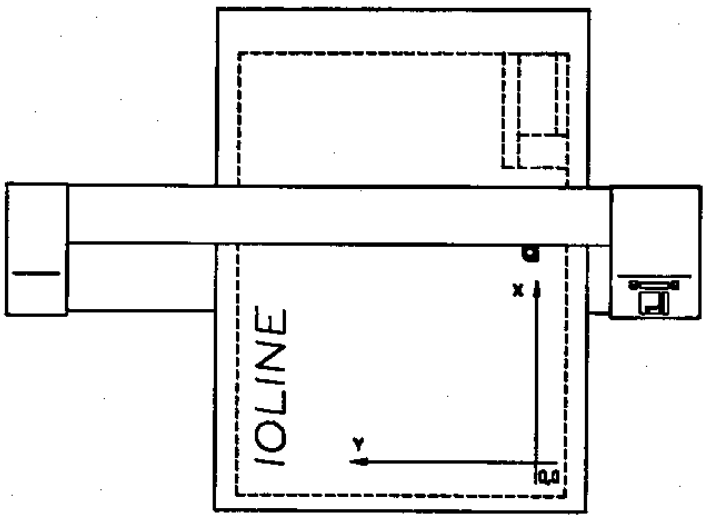


Figure 1-1 X-AXIS AND Y-AXIS MOVEMENT

Media Movement

The X-axis transmission powers the grit shaft and transports media along the X-axis of the Signature5000. The chart wheels (mounted on the square shaft) press the media against the grit shaft and the grit shaft pulls the media under the pen carriage. The chart wheel surfaces are slightly conical and they pull the media out toward the sides of the Signature5000 while they press the media down into the grit shaft. This keeps the media taut and wrinkle-free.

The chart wheels are raised and lowered by a chart hold motor that powers the chart hold lifter arm, which is connected to the left end of the square shaft.

Pen Carriage Movement

The Y-axis transmission powers a belt that transports the pen carriage along the Y-axis of the Signature5000. A tool, such as a pen or a tangential cutter, is attached to the pen carriage. The tool is then pulled along the Y-axis, above the surface of the media.

Pen Lifting and Lowering

A tool, such as a pen or a tangential cutter, is attached to the pen platform on the pen carriage. The pen platform then lifts and lowers the tool, enabling the tool to draw on or cut the media. When a tangential cutter is attached to the pen platform, the blade cannot be lowered into the media until X-axis or Y-axis movement begins.

THE SIGNATURE5000 KEYPAD MENU

The keypad menu structure diagram shows you how to go to different parts of the Signature5000 keypad menu in order to change settings or view current settings. From anywhere in the keypad menu you can go back to the main menu by pressing the [EXIT/CANCEL] key one or more times (depending on how far you are from the main menu, see Figure 1-2).

BASIC SAFETY GUIDELINES

Comply with the following safety guidelines in order to prevent electrical shock and other injuries:

- Only qualified service personnel should attempt any of the subsystem testing or replacement procedures that are described in this manual.
- All subsystem testing or replacement procedures must be performed with the Signature5000 turned off and the power cord removed to avoid the possibility of electrical shock.
- Before you begin any subsystem testing or replacement procedure, make sure that the Signature5000 is on a flat, sturdy, clean, dry surface.
- Keep your fingers and clothing well clear of the grit shaft whenever you are testing the Signature5000.

TOOLS AND EQUIPMENT

All of the tools and equipment that you will need to perform the testing and replacement procedures in Chapter 3 of this manual are listed below.

- Number 1 and number 2 Phillips head screwdrivers
- Flat head screwdriver
- Small flat head screwdriver
- Needle-nose pliers
- 9/64" hex wrench
- 5/64" hex wrench
- 9/64" T-handled hex wrench
- 1/8" square drive
- U-joint socket driver
- Exacto knife
- Double back tape
- Voltmeter

WARNINGS AND CAUTIONS

Warnings

➤➤**WARNING:** **Warnings call your attention to safety procedures that must be followed in order to avoid potential personal injury.**

Cautions

CAUTION: Cautions call your attention to procedures that must be followed in order to maximize equipment performance and avoid a loss of equipment effectiveness.

2 TROUBLESHOOTING GUIDE

This section of the manual contains simple solutions to the most common problems. These are problems that you might be able to solve without replacing an assembly or a circuit board.

SIMPLE SOLUTIONS

You should always perform routine troubleshooting before you move on to specific subsystem testing and replacement procedures. Examine the Signature5000 and it's environment in the following manner:

- Check to see that the AC outlet is providing current at the proper voltage.
- Check the Signature5000 voltage setting.
- Check the fuse.
- Make sure that the power cord is properly connected.

No Power to the Signature5000

If the fan does not go on when the Signature5000 is powered up, perform the following procedure:

1. Verify that the power cord is properly attached to the Signature5000 and plugged into a functional electrical outlet.

2. Disconnect the Signature5000 power cord and verify that the fuse is installed and is in working condition.

The Signature5000 Won't Respond to the Computer

If you have trouble getting the Signature5000 to accept commands from the computer, perform these procedures:

1. Verify that the communications cable is correctly connected to the Signature5000 and to the proper communications port on the computer.

2. Check to see that the computer COM port that you are using is configured to match the Signature5000 serial COM port settings.

3. Make sure that the plot file and the Signature5000 are set to the same language (HP-GL or DM/PL).

4. Perform the loopback communications tests.

ERROR MESSAGES

If an error message appears on the LCD of the Signature5000 keypad, write down the error message and then read the procedures explained in this section of the manual. If the error message indicates the possibility of a mechanical problem (such as a media jam), shut down the Signature5000 and disconnect the power cord before clearing any jams or performing any troubleshooting procedure.

➤➤**WARNING: All cleaning procedures must be performed with the Signature5000 turned off and the power cord removed.**

"INITIALIZATION"
"FAILED: Hit key"

Indicates a failure in carriage initialization. This means that the carriage is unable to move along its path and there may be some obstruction.

1. Turn off the Signature5000 and disconnect the power cord.
2. If you have a pen changer rail installed, remove it.
3. Lift open the dust cover.
4. Inspect the carriage and the carriage path along the traverse rods. Clear away any debris or jammed bits of media. If there is a buildup of dirt or debris along the carriage path, follow the grit shaft, pen lift plate, and traverse rods and rollers cleaning procedures in Chapter 4 of this manual.

"SERIAL ERROR 15:"
"PARITY, FRAMING"

This error message may flash briefly, then disappear. It indicates that the power-up sequence for the computer and the Signature5000 may have been performed incorrectly. This error message may also indicate that the data bits, stop bits, or parity settings are not set identically on both the COM port of the computer and the Signature5000.

Make sure that the Signature5000 COM port settings exactly match the settings of the COM port on the computer. Follow this power-up procedure whenever you use the Signature5000:

1. With the power off, use an Ioline communications cable to connect the Signature5000 to the computer (or Plotservr Plus).
2. Turn on the computer (or Plotservr Plus).
3. Turn on the Signature5000.

"X AXIS JAMMED—"
"Press a key—"

Indicates that the actual position of the grit shaft differs from the commanded position. This may be caused by a media jam or a servomotor problem. Follow this procedure:

1. Turn off the Signature5000 and disconnect the power cord.
2. If you have a pen changer rail installed, rotate it to the up position.
3. Inspect the grit shaft. Clear away any debris or jammed media. If there is a buildup of dirt or debris on the grit shaft, it may be necessary to perform the grit shaft cleaning procedure in Chapter 4 of this manual.

"Y AXIS JAMMED—"
"Press a key—"

Indicates that the actual position of the carriage differs from the commanded position. This may be caused by a media jam or a servomotor problem. Follow this procedure:

1. Turn off the Signature5000 and disconnect the power cord.
2. Lift open the dust cover.
3. Inspect the carriage and the traverse rods. Clear away any debris or jammed media. If there is a buildup of dirt or debris on the carriage or on the traverse rods, it may be necessary to perform the traverse rods and rollers cleaning procedure in Chapter 4 of this manual.

"CHARTHOLD MOTOR"
"JAMMED - HIT KEY"

Indicates that the chart hold mechanism did not respond properly when you pressed the keypad main menu chart hold key
F2 . This may be caused by a mechanical obstruction. Follow this procedure:

1. Turn off the Signature5000 and disconnect the power cord.
2. Lift open the dust cover.
3. If you have a pen changer rail installed, rotate it to the up position.
4. Inspect the chart wheels. Clear away any debris or jammed media.

"PENCHANGER JAMMED"
"Press a Key—"

This message will only occur if you are using the pen changer rail. This message indicates that the pen jaw of the Signature5000 tried to pick up a new pen from the pen changer rail before the pen jaw put the current pen away. This is most likely to happen when you are attempting to produce a plot without first making certain that the pen jaw is empty. If you have a pen changer rail installed, the Signature5000 assumes the pen jaw is empty. Follow this procedure:

3

QUICK START TESTING AND REPLACEMENT PROCEDURES

This section of the manual contains instructions for replacing failed assemblies. There are also some testing procedures to help you determine which assembly has failed. All of the procedures are keyed to at least one illustration. The following procedures are explained and illustrated:

- Pen Carriage Assembly Replacement
- Pen Jaw Replacement
- Tangential Cutter Functionality Test
- Tangential Cutter Replacement
- Tangential Cutter Daughterboard Replacement
- Y-Axis Motor Test
- Y-Axis Transmission Assembly Replacement
- Y-Axis Belt Replacement
- X-Axis Motor Test
- X-Axis Transmission Assembly Replacement
- Grit Shaft Replacement
- Chart Wheel Lifter Arm Replacement
- Chart Wheel Motor Replacement
- Chart Wheel Replacement
- Chart Tape Replacement
- Power Supply Test
- Power Supply Replacement
- Motherboard Test
- Motherboard Replacement
- Keypad Replacement

PEN CARRIAGE SUBSYSTEM

The pen carriage subsystem controls the up and down movement of the installed Signature5000 tool. There are two assembly replacement procedures for this subsystem: pen carriage replacement and pen jaw replacement. Under most circumstances you will replace the entire pen carriage assembly as a single unit if any of the component parts fail or break.

Pen Carriage Replacement

Follow this procedure to replace the pen carriage.

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. Lift up the dust cover.
4. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.
5. Use a 9/64 hex wrench to loosen the pen carriage belt tension screw.
6. Use a small flat head screwdriver to remove the four E-clips from the back of the pen carriage.
7. Remove the pen carriage plate.
8. Put a piece of tape around the ribbon cable to prevent the cable retracting into the end plate.
9. Loosen the pen carriage cable clamp retaining screws and the clip that holds the cable. This clip is located between the two screws and the carriage body.
10. Remove the pen carriage cable from the pen carriage and then pull a length of the pen carriage cable out of the cable cartridge assembly and drape the cable over the platen.
11. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.
12. Unscrew and remove the pen carriage belt screw from the back of the pen carriage.
13. Use the pen carriage belt retaining screw to attach the pen carriage belt to the back of the new pen carriage assembly.
14. Set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod.
15. Gently pull on the pen carriage belt (flex it away from the Signature5000). Then slide the pen carriage plate under the belt and attach the plate to the back of the new pen carriage assembly. Make sure the belt is on the outside of the plate.
16. Insert the pen carriage cable into the new pen carriage assembly and tighten the pen carriage cable clamp retaining screws.
17. Use a needle-nose pliers to re-attach the four E-clips.

18. Make sure that the pen carriage belt tensioner bracket is securely seated to the left end plate of the Signature5000 and then use a 9/64 hex wrench to tighten the pen carriage belt tension screw.

19. Gently slide the pen carriage to either the far right or far left position of the I-beam, as far as it will go.

20. Gently pull on the middle of the pen carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) of pressure to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.

21. Reconnect the power cord and turn on the Signature5000.

22. Re-install the left end cap.

23. From the main menu, press [F4] (arrow).

24. Press [F3] Action.

25. Press [F2] Test.

26. Press [F4] (arrow).

27. Press [F3] Debug.

    Use the numerical keypad to enter the Debug Password: 192837.

28. Press the [ENTER] key.

29. Press [F1] ArbPrim.

    Use the numerical keypad to enter the ArbPrim number (Arbitrary Primitive): 198.

30. Press the [ENTER] key.

    You will see a blinking cursor on the first line of the keypad LCD.

31. Press the [ENTER] key.

    You will see a blinking cursor on the second line of the keypad LCD.

32. Press the [ENTER] key.

    Use this display to determine the correct pen height setting as you manually adjust the pen carriage potentiometer. The correct pen height setting is e6.

33. Make sure that no tools are attached to the pen lift plate (such as a pen or a tangential cutter) and then gently press the pen jaw (or cutter fork) assembly down as far as possible.

34. While holding down the pen fork (or cutter jaw), use a small, flat head screwdriver to twist the pen carriage potentiometer until the keypad LCD displays the following:

    PenHte6

> *Note: Twisting the pen carriage potentiometer clockwise will raise the number on the keypad LCD. Twisting it counterclockwise will lower the number.*

35. Turn off the Signature5000.

36. Lower the dust cover and reconnect the power cord and interface cables.

Pen Jaw Replacement

Follow this procedure to replace the pen jaw.

1. Turn off the Signature5000 and disconnect the power cord.

2. Disconnect any interface cables.

3. Lift up the dust cover.

4. Remove the pen jaw by loosening the Phillips head screw that holds the pen jaw to the pen lift plate. Set the pen jaw and the screw and washer aside (see Figure 3-1).

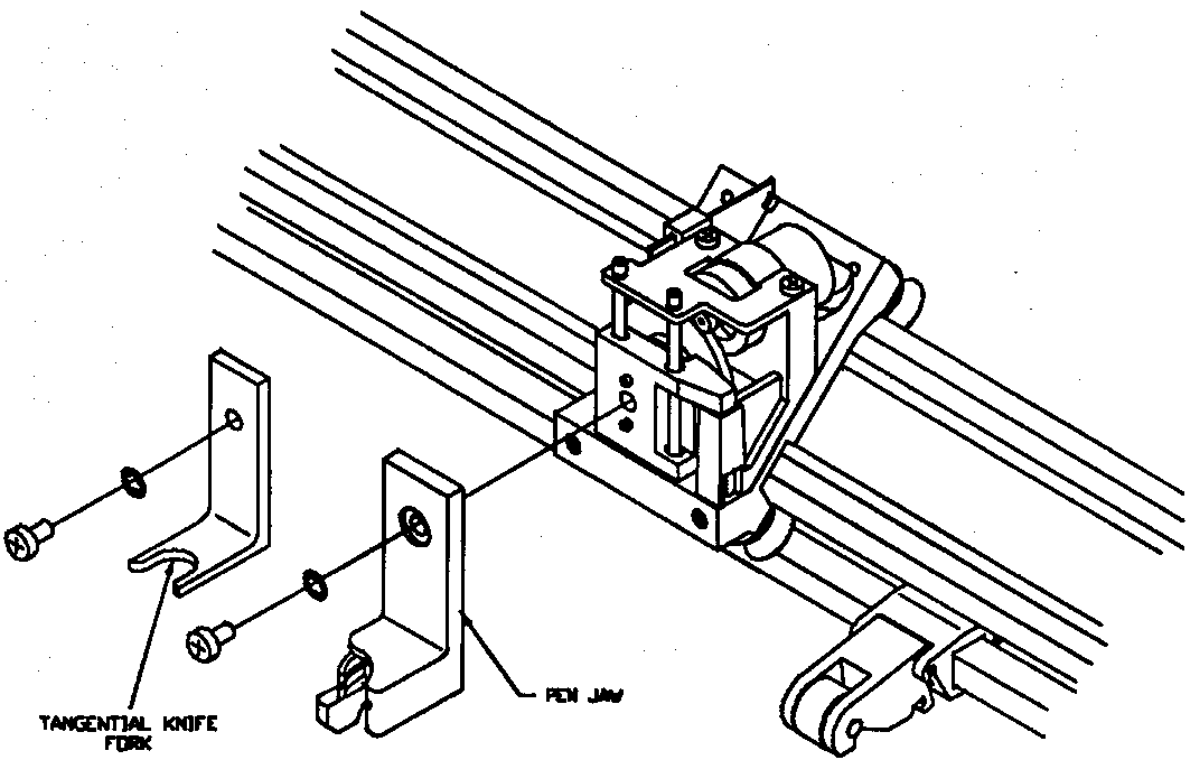


Figure 3-1 Removing the pen jaw

5. Place the new pen jaw against the pen lift plate and use the washer and the Phillips head screw to secure the pen jaw in place.

6. Lower the dust cover and reconnect the power cord and interface cables.

TANGENTIAL CUTTER SUBSYSTEM

The tangential cutter subsystem turns the Signature5000 into a media cutting platform. There are two assembly replacement procedures for this subsystem: cutter replacement and daughterboard replacement. The tangential cutter functionality test will help you determine whether the tangential cutter has failed.

Tangential Cutter Functionality Test

Turn on the Signature5000. The keypad LCD is activated when you turn on the Signature5000. At power-up, a self-test procedure will run automatically. Upon successful completion of this self-test procedure, the first message displayed on the keypad LCD will be:

```
VX.xx Press a
Key to Start...
```

At this point perform the following procedures to determine whether the tangential cutter assembly has failed.

1. Press a key to initialize the Signature5000.

   If the tangential cutter blade spins wildly, or if you hear a grinding noise, turn off the Signature5000 and go to the tangential cutter replacement procedure. Otherwise, continue with the functionality test.

2. Prepare to generate an automatic test cut by loading a sheet of vinyl onto the Signature5000.

3. From the main menu, press [F4] (arrow).

4. Press [F1] Setup.

5. Press [F4] (arrow).

6. Press [F1] Knife.

7. Press [F1] Test Mode. The keypad LCD will display: "Press Enter to Cut"

8. Press the [ENTER] key.

   The Signature5000 should successfully perform a test cut. If it does not, go to the tangential cutter daughterboard replacement procedure.

Tangential Cutter Replacement

Follow this procedure to replace the Tangential Cutter.

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. Lift up the dust cover.
4. Remove the cable connector from the receptacle at the top left side of the pen carriage (see Figure 3-2).

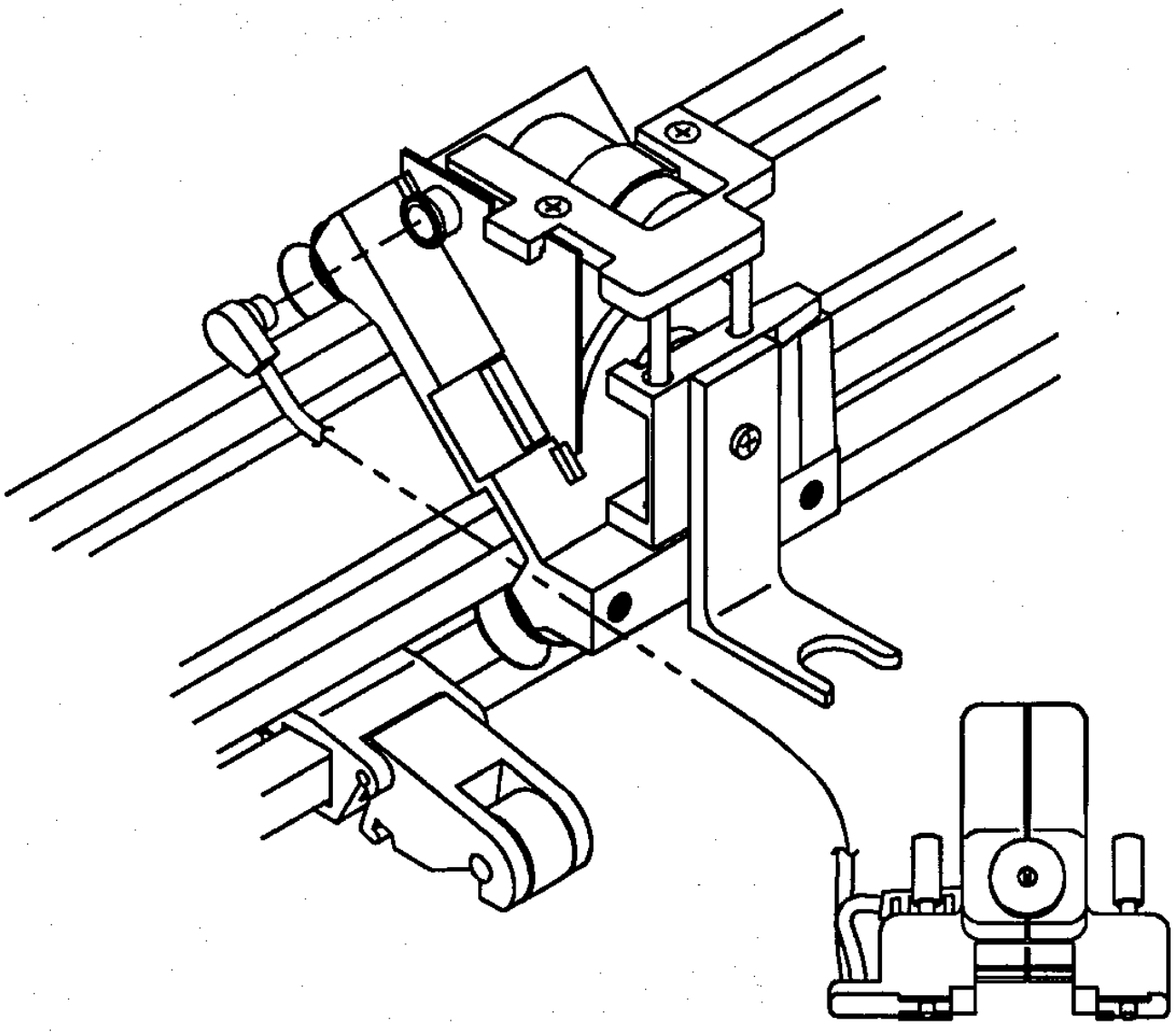


Figure 3-2 Removing the cable connector

5. Loosen the thumb screws that secure the tangential cutter to the pen carriage (see Figure 3-3).

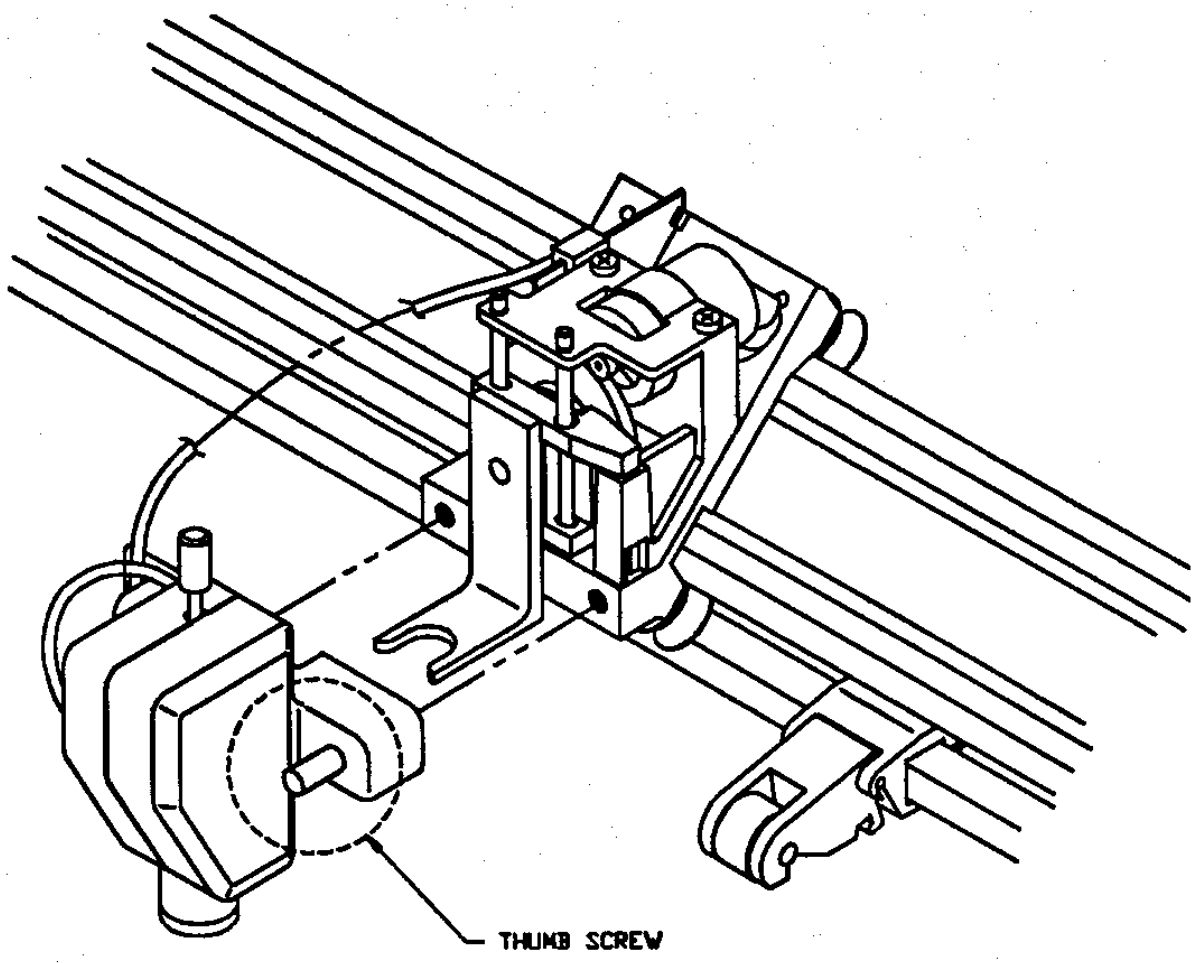


Figure 3-3 Removing the Tangential Cutter

6. Remove the tangential cutter assembly.
7. Gently slide the pen carriage to the far right position of the I-beam (toward the keypad) as far as it will go.
8. Insert the cable connector of the new tangential cutter assembly in the receptacle at the top left side of the pen carriage.
9. Carefully place the tangential cutter on top of the top right cover of the Signature5000.
10. Connect the power cord and turn on the Signature5000.
11. Make sure that the main menu is displayed on the keypad LCD.
12. Press F4 (arrow).
13. Press F1 Setup.
14. Press F4 (arrow).
15. Press F1 Knife.

16. Press F3 Offset.

17. Hold the tangential cutter so you can see both the knife blade and the molded groove line. Enter numerical values on the keypad until the blade is precisely aligned with the molded groove line (see Figure 3-4). To rotate the blade clockwise, enter a negative number. To rotate the blade counter- clockwise, enter a positive number.

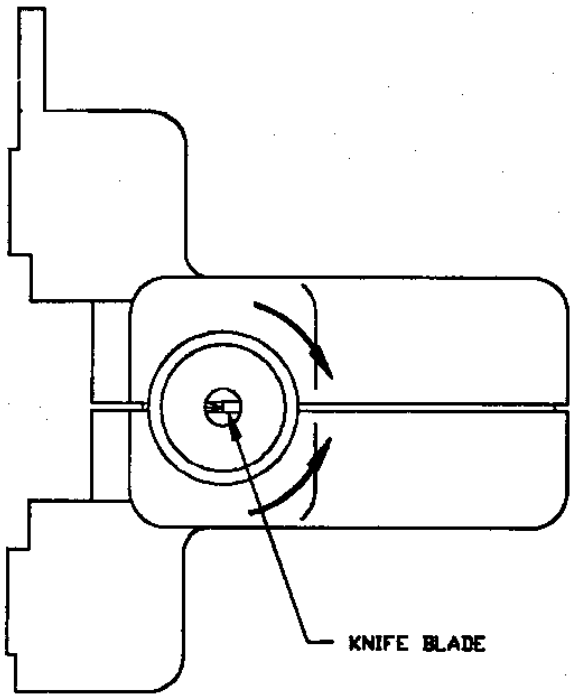


Figure 3-4 Blade alignment

If the blade is slightly offset to the right of the molded groove line, enter a single digit number and then check the blade. If the blade is still slightly offset to the right, enter a lower number. If the blade is slightly offset to the left of the molded groove line, enter a single digit negative number, as described in the following procedure.

1. To enter a negative number, Press F1 (to create a minus sign on the LCD), then enter the numerical value that you want to use. From this menu, the F1 key acts as a toggle, alternately displaying negative and positive values each time you press it.

2. Turn off the Signature5000 and disconnect the power cord.

3. Align the two tangential cutter thumb screws with the thumb screw holes on either side of the cutter fork. Then press the depth adjustment knob completely down and insert the exposed notch onto the cutter fork.

4. Simultaneously tighten the thumb screws to secure the tangential cutter to the pen carriage.

5. Lower the dust cover and reconnect the power cord and interface cables.

Tangential Cutter Daughterboard Replacement

Follow this procedure to replace the Tangential Cutter daughter board.

> *Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.*

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.
4. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges (see Figure 3-5).

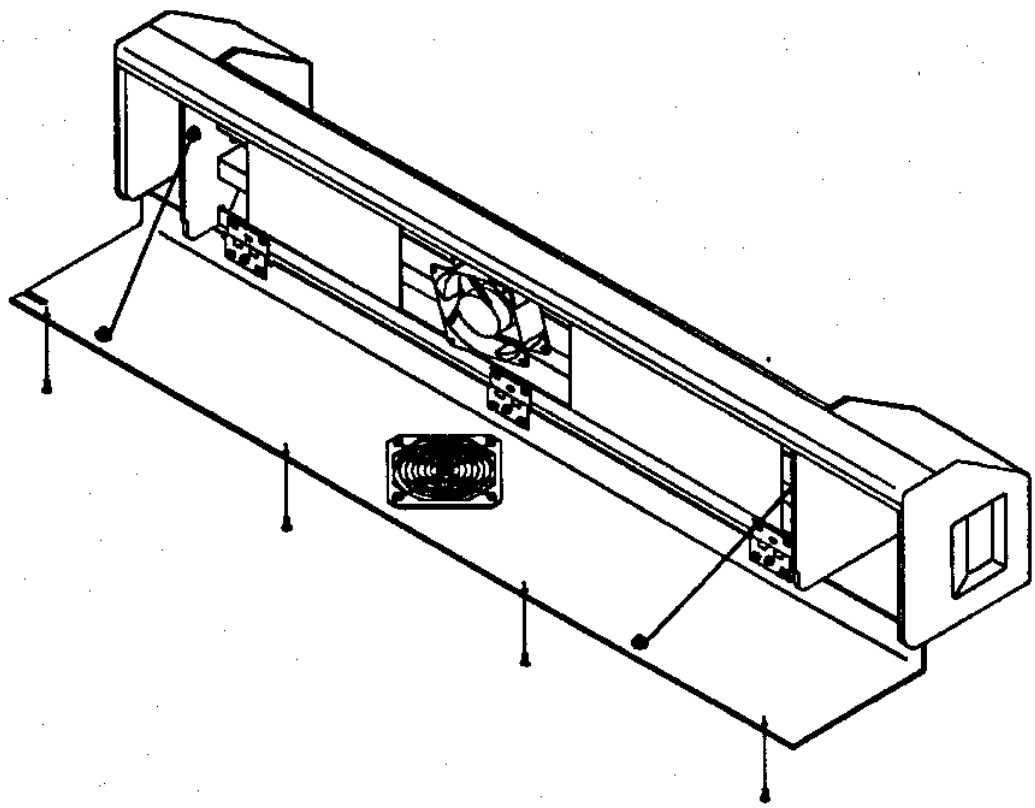


Figure 3-5 Open the Signature5000

5. Unscrew and remove the four 4-40 mounting screws that fasten the daughterboard to the motherboard (see Figure 3-6).

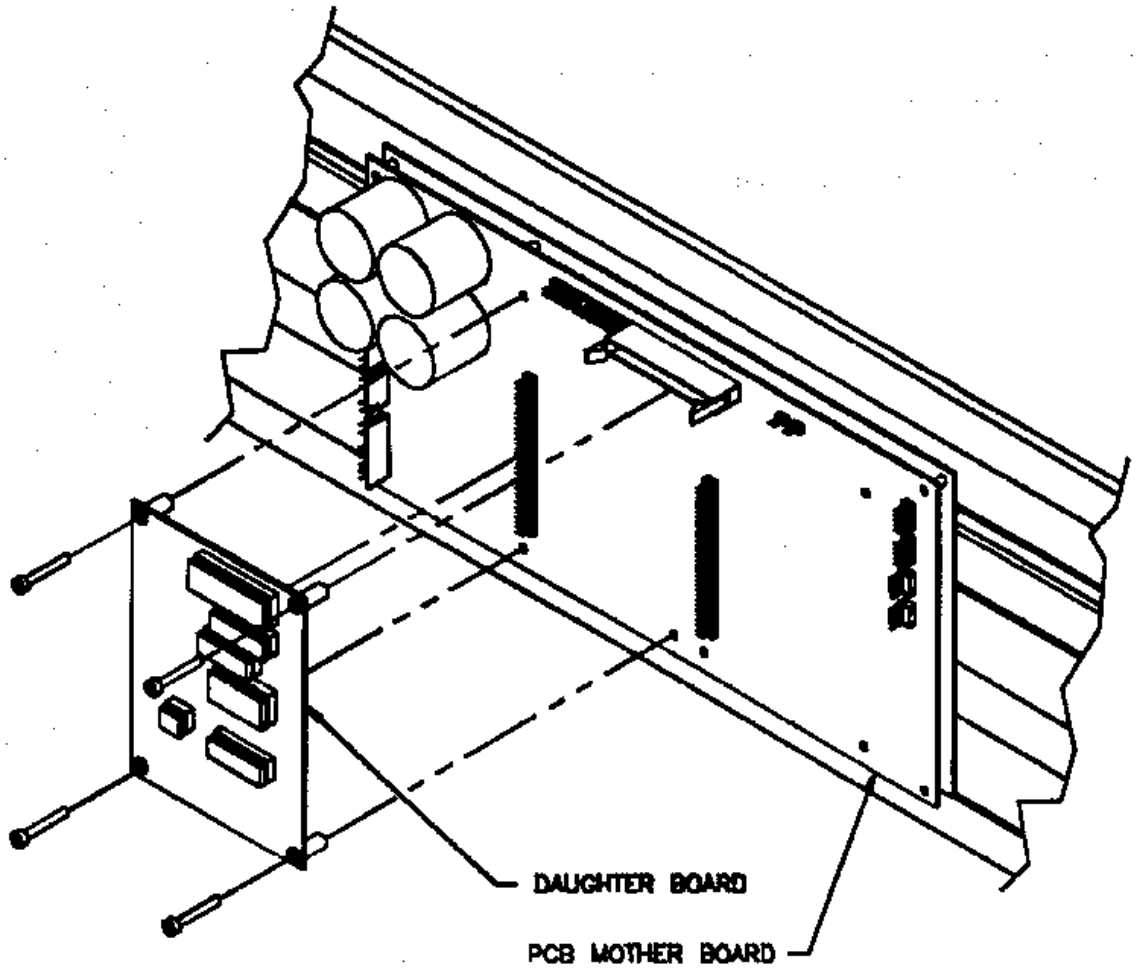


Figure 3-6 Replacing the daughterboard

6. Gently pull the daughterboard 64-pin receptacle away from the motherboard 64-pin connector.

7. Remove the old daughterboard.

8. The new daughterboard 64-pin receptacle is located at the edge of the board. Use this edge as the left-hand orientation of the daughterboard. Align the left row of the 64-pin receptacle on the bottom of the cutter daughterboard with the left row of the 64-pin connector on the Signature5000 motherboard. Gently roll the 64-pin receptacle onto the right row of the 64-pin connector. When the pins are correctly lined up, firmly press the connector onto the receptacle (see Figure 3-7).

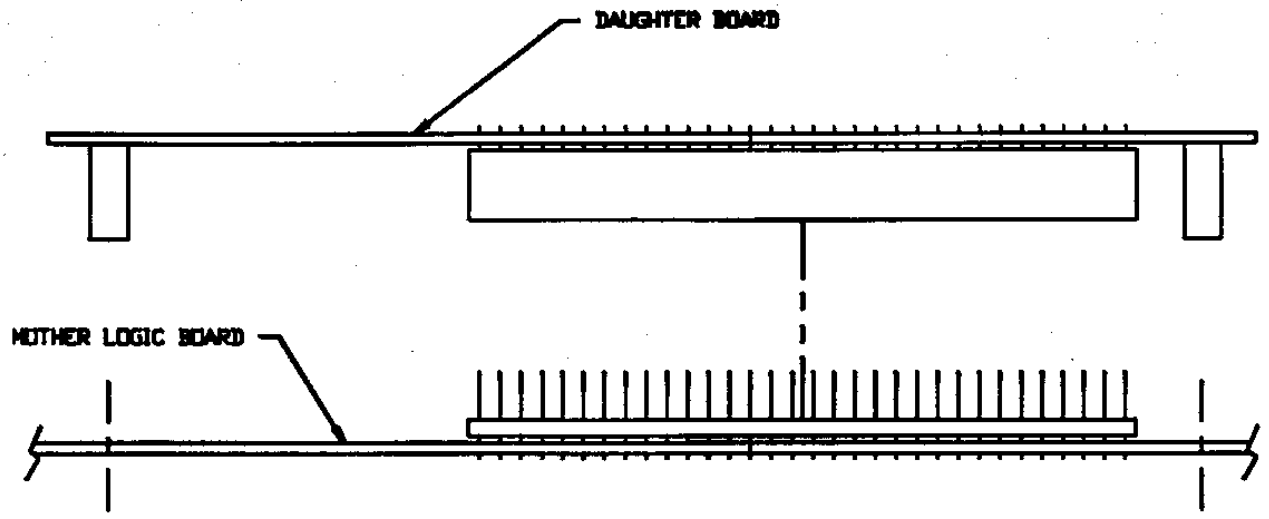


Figure 3-7 The 64-pin connector

➤➤**WARNING: You must accurately align the 64-pin receptacle with the 64-pin connector. If you do not precisely align these pins, you may cause permanent damage to the tangential cutter daughterboard and/or the Signature5000 motherboard.**

9. Use the four 4-40 mounting screws to fasten the new daughterboard to the motherboard.

10. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.

11. Re-install the four screws in the bottom of the Signature5000.

12. Reconnect the power cord and interface cable.

Y-AXIS SUBSYSTEM

The Y-axis subsystem is the part of the Signature5000 that moves the pen carriage back and forth along the Y-axis. There are two replacement procedures for this subsystem: transmission assembly replacement and belt replacement. The Y-axis motor test will help you determine whether the Y-axis motor has failed.

Y-Axis Motor Test

If you are repeatedly getting this error message on the keypad LCD:

```
"Y AXIS JAMMED—"
"Press a key—"
```

the actual position of the pen carriage may differ from the commanded position. This may be caused by a media jam or a Y-axis motor problem. Use the [4] and [6] keypad keys to move the pen carriage back and forth. If the movement is uneven, hesitant, or

in any way unusual, or if you hear a ticking sound, continue with the Y-axis motor test procedure.

1. Turn off the Signature5000 and disconnect the power cord.

2. Disconnect any interface cables.

3. Lift up the dust cover.

4. Inspect the pen carriage and the traverse rods. Clear away any debris or jammed media. If there is a buildup of dirt or debris on the pen carriage or on the traverse rods, you may need to clean the traverse rods and rollers as explained in Chapter 4 of this manual. If the error message persists, continue with the Y-axis motor test procedure. If there is not a problem with the Y-axis motor, you may have to replace the Signature5000 motherboard. That procedure is described in the Electronic Subsystem section of this chapter of the manual.

5. Unscrew and remove the three screws that hold the right-end cap to the Signature5000 and remove the right end cap.

6. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.

7. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

8. Examine the area where the motor gear and the large gear meet. Make sure that you do not touch the PCB or any electronic assembly. See if there is excessive backlash, or a gap between the motor gear teeth and the large gear teeth. There should not be a gap.

9. If you find a gap, loosen the three Phillips head screws that hold the Y-axis motor assembly to the motor bracket.

10. Press the motor gear teeth until they are flush against the large gear teeth and then tighten the three motor bracket screws.

11. Inspect the motor gear teeth for any signs of wear or chipping of the teeth. If you find any signs of wear, go to the Y-axis transmission assembly replacement procedure.

Y-Axis Transmission Assembly Replacement

Follow this procedure to replace the Y-axis transmission assembly.

Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.

1. Turn off the Signature5000 and disconnect the power cord.

2. Disconnect any interface cables.

3. Lift up the dust cover.

4. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.

5. Use a 9/64 hex wrench to loosen the pen carriage belt tension screw.

6. Use a small flat head screwdriver to remove the four E-clips from the back of the pen carriage.

7. Remove the pen carriage plate.

8. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.

9. Unscrew and remove the pen carriage belt screw from the back of the pen carriage.

10. To prevent damage to the pen carriage, carefully set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod and slide the pen carriage all the way to the left, against the left end plate.

11. Unscrew and remove the three screws that hold the right end cap to the Signature5000 and remove the right end cap.

12. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.

13. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

14. Remove the four screws and washers that hold the Y-axis transmission assembly to the right end plate of the Signature5000 (see Figure 3-8).

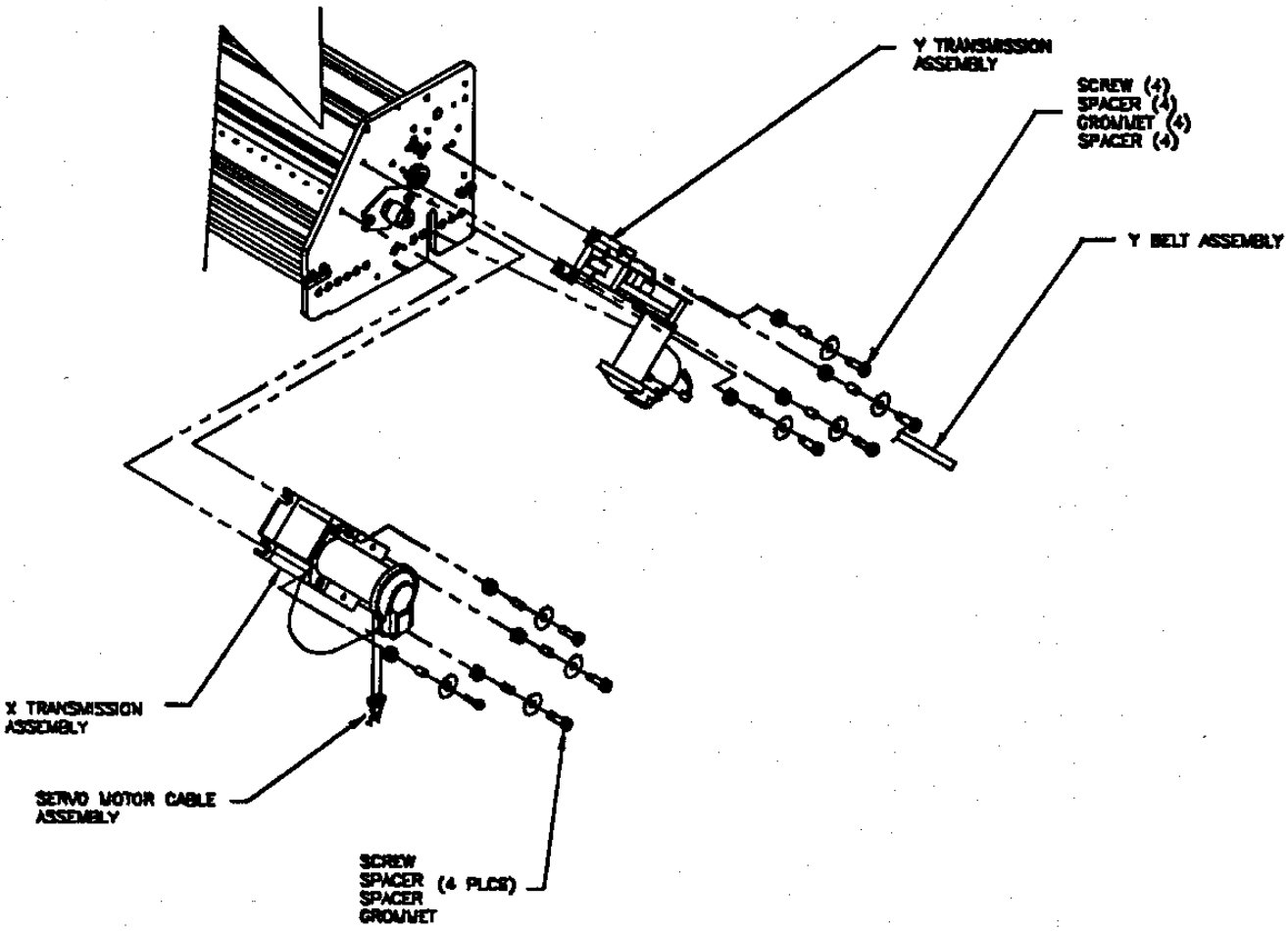


Figure 3-8 The X-axis and Y-axis motor assemblies

15. Pull out the Y-axis transmission assembly.

16. Disconnect the DC power cables (the black and white twisted cables).

17. Carefully check the route of the gray encoder cable from the Y-axis transmission assembly to the connector on the motherboard.

18. Cut all of the cable ties and discard them.

19. Disconnect the gray encoder cable from the connector on the motherboard.

20. Connect the DC power cables (the black and white twisted cables) to the new Y-axis transmission assembly. Plug the white cable onto the red post and plug the black cable onto the other post.

21. Hold the new Y-axis transmission assembly against the right end plate of the Signature5000.

22. Use the four screws and washers to attach the new Y-axis transmission assembly to the right end plate of the Signature5000.

23. Route the gray encoder cable from the new Y-axis transmission assembly to the connector on the motherboard and plug it in.

24. Use cable ties to secure the gray encoder cable and the DC motor power cable.

25. Pull the two ends of the pen carriage belt together to make sure that the belt hasn't snagged or twisted. Make sure the belt teeth are facing the inside of the Signature5000.

26. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.

27. Re-install the four screws in the bottom of the Signature5000.

28. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.

29. Use the pen carriage belt retaining screw to attach the ends of the pen carriage belt to the back of the pen carriage assembly.

30. Carefully set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod.

31. Gently pull on the pen carriage belt (flex it away from the Signature5000). Then slide the pen carriage plate under the belt and attach the plate to the back of the new pen carriage assembly. Make sure the belt is on the outside of the plate.

32. Use a needle-nose pliers to re-attach the four E-clips.

33. Make sure the pen carriage belt tensioner bracket is securely seated to the left end plate of the Signature5000 and then use a 9/64 hex wrench to tighten the pen carriage belt tension screw.

34. Gently slide the pen carriage to either the far right or far left position of the I-beam, as far as it will go.

35. Gently pull on the middle of the pen carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) of pressure to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.

36. Re-install the left and right end caps, lower the dust cover, and reconnect the power cord and interface cables.

Y-Axis Belt Replacement

Follow this procedure to replace the Y-axis belt.

1. Turn off the Signature5000 and disconnect the power cord.

2. Disconnect any interface cables.

3. Lift up the dust cover.

4. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.

5. Use a 9/64 hex wrench to loosen the pen carriage belt tension screw.

6. Use a small flat head screwdriver to remove the four E-clips from the back of the pen carriage.

7. Remove the pen carriage plate.

8. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.

9. Unscrew and remove the pen carriage belt screw from the back of the pen carriage.

10. To prevent damage to the pen carriage, carefully set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod and slide the pen carriage all the way to the left, against the left end plate.

11. Unscrew and remove the three screws that hold the right end cap to the Signature5000 and remove the right end cap.

12. The Y-axis belt loops around an idler pulley and a drive gear in the Y-axis transmission assembly. Pull the Y-axis belt through the right end plate to disengage it, and then pull it away from the Signature5000.

13. Pull one end of the new Y-axis belt through the right end plate, over the idler pulley, around the Y transmission drive gear, and back through the right end plate.

14. Pull the other end of the new Y-axis belt through the left-end Y-axis belt tensioner.

15. Pull the two ends of the pen carriage belt together and make sure that the belt hasn't snagged or twisted.

16. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.

17. Use the pen carriage belt retaining screw to attach the ends of the pen carriage belt to the back of the pen carriage assembly.

18. Carefully set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod.

19. Gently pull on the pen carriage belt (flex it away from the Signature5000). Then slide the pen carriage plate under the belt and attach the plate to the back

of the new pen carriage assembly. Make sure the belt is on the outside of the plate.

20. Use a needle-nose pliers to re-attach the four E-clips.

21. Make sure that the pen carriage belt tensioner bracket is securely seated to the left end plate of the Signature5000 and then use a 9/64 hex wrench to tighten the pen carriage belt tension screw.

22. Gently slide the pen carriage to either the far right or far left position of the I-beam, as far as it will go.

23. Gently pull on the middle of the pen carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) of pressure to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.

24. Re-install the left and right end caps, lower the dust cover, and reconnect the power cord and interface cables.

X-AXIS SUBSYSTEM

The X-axis subsystem is the part of the Signature5000 that moves the media forward and back along the X-axis. There are two replacement procedures for this subsystem: transmission assembly replacement and grit shaft replacement. The X-axis motor test will help you determine whether the X-axis motor has failed.

X-Axis Motor Test

If you are repeatedly getting this error message on the keypad LCD:

```
"X AXIS JAMMED—"
"Press a key—"
```

the actual position of the grit shaft may differ from the commanded position. This may be caused by a media jam or an X-axis motor problem. Use the [2] and [8] keypad keys to rotate the grit shaft. If you hear an unusual sound or if the movement is uneven or hesitant, continue with the X-axis motor test procedure.

1. Turn off the Signature5000 and disconnect the power cord.

2. Disconnect any interface cables.

3. Lift up the dust cover.

4. Inspect the grit shaft. Clear away any debris or jammed media. If there is a buildup of dirt or debris on the grit shaft, you may need to clean the grit shaft as explained in Chapter 4 of this manual. If the error message persists, continue with the X-axis motor test procedure.

5. Unscrew and remove the three screws that hold the right-end cap to the Signature5000 and remove the right end cap.

6. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.

7. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

8. Examine the area where the X-axis motor gear and the large gear meet. See if there is excessive backlash, or a gap between the motor gear teeth and the large gear teeth. There should not be a gap.

9. If you find a gap, loosen the three Phillips head screws that hold the X-axis motor assembly to the motor bracket.

10. Press the motor gear teeth until they are flush against the large gear teeth and then tighten the three motor bracket screws.

11. Inspect the motor gear teeth for any signs of wear or chipping of the teeth. If you find any signs of wear, go to the X-axis transmission assembly replacement procedure.

X-Axis Transmission Assembly Replacement

Follow this procedure to replace the X-axis transmission assembly.

> *Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.*

1. Turn off the Signature5000 and disconnect the power cord.

2. Disconnect any interface cables.

3. Lift up the dust cover.

4. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.

5. Unscrew and remove the three screws that hold the right end cap to the Signature5000 and remove the right end cap.

6. Use a 9/64 hex wrench to loosen the pen carriage belt tension screw.

7. Use a small flat head screwdriver to remove the four E-clips from the back of the pen carriage.

8. Remove the pen carriage plate.

9. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.

10. Unscrew and remove the pen carriage belt screw from the back of the pen carriage.

11. To prevent damage to the pen carriage, carefully set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod and slide the pen carriage all the way to the left, against the left end plate.

12. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.

13. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

14. Remove the four screws and washers that hold the Y-axis transmission assembly to the right end plate of the Signature5000.

15. Pull out the Y-axis transmission assembly.

16. Remove the four screws and washers that hold the X-axis transmission assembly to the right end plate of the Signature5000.

17. On the right side of the Signature5000, between the X-axis transmission assembly and the end of the grit shaft, you will find a flex coupling. This flex coupling has a set screw on one end. Use a 5/64 hex wrench to loosen both of this set screw.

18. Pull out the X-axis transmission assembly.

19. Disconnect the DC power cables (the black and white twisted cables).

20. Carefully check the route of the gray encoder cable from the X-axis transmission assembly to the connector on the motherboard.

21. Cut all of the cable ties and discard them.

22. Disconnect the gray encoder cable from the connector on the motherboard.

23. Connect the DC power cables (the black and white twisty cables) to the new X-axis transmission assembly. Plug the white cable onto the red post and plug the black cable onto the other post.

24. Hold the new X-axis transmission assembly against the right end plate of the Signature5000.

25. Use the four screws and washers to attach the new X-axis transmission assembly to the right end plate of the Signature5000.

26. Route the gray encoder cable from the new X-axis transmission assembly to the connector on the motherboard and plug it in.

27. Use cable ties to secure the gray encoder cable and the DC motor power cable.

28. Use the four screws and washers to re-install the Y-axis transmission assembly to the right end plate of the Signature5000.

29. Pull the two ends of the pen carriage belt together to make sure that the belt hasn't snagged or twisted. Make sure the belt teeth are facing the inside of the Signature5000.

30. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.

31. Re-install the four screws in the bottom of the Signature5000.

32. Pull the top of the pen carriage off the upper traverse rod and then pull the bottom of the pen carriage away from the lower traverse rod.

33. Use the pen carriage belt retaining screw to attach the ends of the pen carriage belt to the back of the pen carriage assembly.

34. Carefully set the top pen carriage wheels onto the top traverse rod, then gently snap the lower pen carriage wheels onto the lower traverse rod.

35. Gently pull on the pen carriage belt (flex it away from the Signature5000). Then slide the pen carriage plate under the belt and attach the plate to the back of the new pen carriage assembly. Make sure the belt is on the outside of the plate.

36. Use a needle-nose pliers to re-attach the four E-clips.

37. Make sure that the pen carriage belt tensioner bracket is securely seated to the left end plate of the Signature5000 and then use a 9/64 hex wrench to tighten the pen carriage belt tension screw.

38. Gently slide the pen carriage to either the far right or far left position of the I-beam, as far as it will go.

39. Gently pull on the middle of the pen carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) of pressure to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.

40. Re-install the left and right end caps, lower the dust cover, and reconnect the power cord and interface cables.

Grit Shaft Replacement

Follow this procedure to replace the grit shaft.

Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.

1. Turn on the Signature5000.
2. Make sure the main menu is displayed on the keypad LCD.
3. If the chart wheels are down, press F2 (Charthold) to raise the chart wheels.
4. Turn off the Signature5000 and disconnect the power cord.
5. Disconnect any interface cables.
6. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.
7. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.
8. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.
9. Unscrew and remove the three screws that hold the right end cap to the Signature5000 and remove the right end cap.
10. On the right side of the Signature5000, between the X-axis transmission assembly and the end of the grit shaft, you will find a flex coupling. This flex coupling has a set screw on each end. Use a 5/64 hex wrench to loosen both of these set screws.

Note: You may have to use a pliers to hold the hex wrench in order to reach the flex coupling set screws.

11. Unscrew and remove the four screws that hold the X-axis transmission assembly mounting bracket to the right end plate.
12. Unscrew and remove the two square drive screws that hold the grit shaft bearing retainer plate to the right end plate.
13. Remove the grit shaft retainer plate.
14. Remove the spacer and the wave washer.
15. If you have tangential cutter daughterboard installed, remove it by unscrewing the four 4-40 mounting screws that fasten the daughterboard to the motherboard.
16. Gently pull the daughterboard 64-pin receptacle away from the motherboard 64-pin connector.
17. Remove the daughterboard. Set it aside on a static-free surface.

Note: Mark the locations of all the motherboard connectors before you disconnect any of them. This will make it much easier to correctly re-install the connectors after you re-install the motherboard.

18. Mark and disconnect the eight cable connectors that are plugged into the motherboard.

19. Unscrew and remove the six screws that hold the motherboard to the motherboard mounting plate.

20. Remove the motherboard. Set it aside on a static-free surface.

21. Unscrew and remove the four screws and star washers that hold the motherboard mounting plate to the frame of the Signature5000.

22. Remove the motherboard mounting plate.

23. Unscrew and remove the two Phillips head screws that hold the cooling fan to the Signature5000 frame. Also remove the two star washers and the two spacers.

24. Remove the cooling fan.

25. On the left side of the Signature5000, disconnect the extension spring from the chart wheel motor bracket.

26. Unscrew and remove the (square drive) square shaft end screw and washer.

27. Remove the chart wheel lifter arm from the left side of the square shaft.

28. Remove the bearing block from the left side of the square shaft.

29. Leave the square shaft in place.

30. Unscrew and remove the two Phillips head screws that hold the chart wheel motor assembly mounting bracket to the left end plate of the Signature5000.

31. Cut the cable ties.

32. Remove the DC power cables that run from the chart wheel motor to the ribbon cable cartridge printed circuit board (PCB).

33. Remove the chart wheel motor.

34. Place the head of a screwdriver against the grit shaft axle pin. The grit shaft axle pin is seated in a bearing in the left end plate of the Signature5000.

35. Gently but firmly tap the butt of the screwdriver (with the head of a screwdriver against the grit shaft axle pin) until the axle pin clears the bearing.

36. At this point, the right end of the grit shaft should be pushing through the right end plate of the Signature5000. Remove the bearing, bearing sleeve, and spacer from the right end of the grit shaft.

37. Gently slide the grit shaft to the right until the left end of the grit shaft clears the power supply of the Signature5000.

38. Slide the left end of the grit shaft out through the underside of the Signature5000.

39. Remove the grit shaft.

40. Before you install the new grit shaft, check the orientation of the shaft and make sure that the grit shaft axle pin will be seated in the left end plate of the Signature5000.

41. Slide the right end of the new grit shaft through the underside of the Signature5000. Then continue to slide it through the grit shaft slot in the right end plate until the left end clears the power supply.

42. Install the bearing, bearing sleeve, and spacer on the right end of the new grit shaft.

43. Slide the left end of the new grit shaft into the bearing in the left end plate of the Signature5000.

44. Re-install the chart wheel motor assembly mounting bracket in the left end plate of the Signature5000.

45. Reconnect the DC power cables from the chart wheel motor to the ribbon cable cartridge printed circuit board (PCB).

46. Install new cable ties.

47. Re-install the bearing block on the left side of the square shaft.

48. Re-install the chart wheel lifter arm on the left side of the square shaft.

49. Re-install the (square drive) square shaft washer and end screw on the end of the square shaft. Tighten this screw, leaving approximately .015 inch end play.

50. Reconnect the extension spring to the chart wheel motor bracket.

51. Re-install the cooling fan to the Signature5000 frame.

52. Re-install the motherboard mounting plate to the Signature5000 frame.

53. Re-install the motherboard to the motherboard mounting plate.

54. Reconnect the eight cable connectors to the motherboard.

55. Re-install the tangential cutter daughterboard (if necessary).

56. Re-install the grit shaft bearing retainer plate in the right end plate of the Signature5000.

57. Re-install the flex coupling onto the grit shaft bearing retainer plate, but don't tighten it.

58. Re-install the X-axis transmission assembly to the right end plate of the Signature5000.

59. Tighten both hex screws on the X-axis flex coupling.

60. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.

61. Re-install the four screws, spaced evenly along the bottom front edge of the Signature5000.

62. Re-install the left and right end caps and reconnect the power cord and interface cables.

CHART HOLD SUBSYSTEM

The chart hold subsystem is the part of the Signature5000 that holds the media in place against the grit shaft. There are four assembly replacement procedures for this subsystem: chart wheel lifter arm replacement, chart wheel motor replacement, chart wheel replacement, and chart tape replacement (see Figure 3-9).

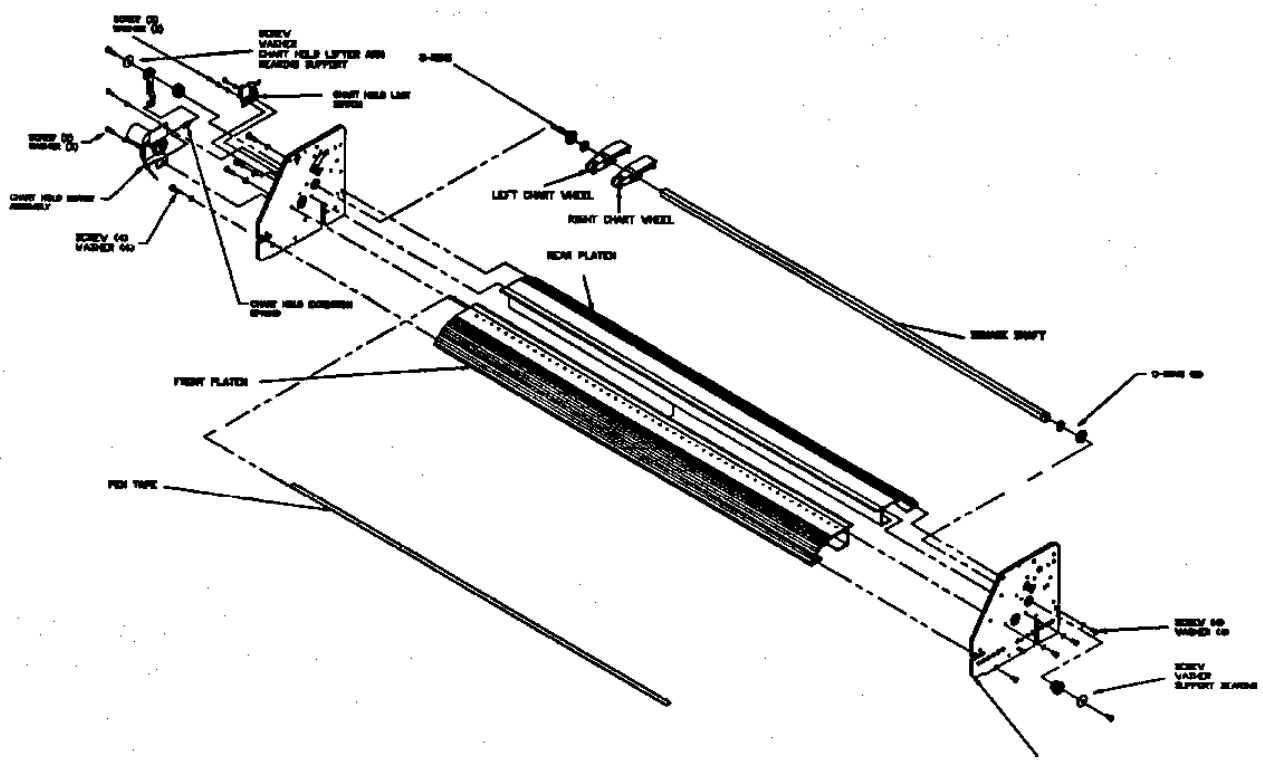


Figure 3-9 The Chart Hold subsystem

Chart Wheel Lifter Arm Replacement

Follow this procedure to replace the chart wheel lifter arm.

1. Turn on the Signature5000.
2. Make sure the main menu is displayed on the keypad LCD.
3. If the chart wheels are down, press F2 (Charthold) to raise the chart wheels.
4. Turn off the Signature5000 and disconnect the power cord.
5. Disconnect any interface cables.
6. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.
7. Disconnect the extension spring from the chart wheel motor bracket.
8. Unscrew and remove the (square drive) square shaft end screw and the washer.
9. Remove the chart wheel lifter arm from the square shaft.
10. Install the new chart wheel lifter arm onto the square shaft.
11. Re-install the (square drive) square shaft washer and end screw on the end of the square shaft. Tighten this screw, leaving approximately .015 inch end play.
12. Reconnect the extension spring to the chart wheel motor bracket.
13. Re-install the left end cap and reconnect the power cord and interface cables.

Chart Wheel Motor Replacement

Follow this procedure to replace the chart wheel motor.

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.
4. Disconnect the extension spring from the chart wheel motor bracket.
5. Unscrew and remove the two Phillips head screws that hold the chart wheel motor assembly mounting bracket to the left end plate of the Signature5000.
6. Cut the cable ties.
7. Remove the DC power cables that run from the chart wheel motor to the ribbon cable cartridge PCB.

8. Remove the chart wheel motor.

9. Install the new chart wheel motor assembly mounting bracket in the left end plate of the Signature5000.

10. Reconnect the DC power cables from the chart wheel motor to the ribbon cable cartridge PCB.

11. Install new cable ties.

12. Reconnect the extension spring to the chart wheel motor bracket.

13. Re-install the left end cap and reconnect the power cord and interface cables.

Chart Wheel Replacement

Follow this procedure to replace the chart wheels.

1. Turn on the Signature5000.

2. Make sure the main menu is displayed on the keypad LCD.

3. If the chart wheels are down, press F2 (Charthold) to raise the chart wheels.

4. Turn off the Signature5000 and disconnect the power cord.

5. Disconnect any interface cables.

6. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.

7. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

8. Unscrew and remove the three screws that hold the right end cap to the Signature5000 and remove the right end cap.

9. Carefully wrap the head of a 9/64 T-handled hex driver in double-back tape.

> *Note: The double-back tape is necessary because this screw could easily fall into the Signature5000. It would be very difficult to retrieve.*

10. Use the 9/64 T-handled hex driver to remove the (square drive) square shaft screw and washer.

11. Unscrew and remove the three screws that hold the left end cap to the Signature5000 and remove the left end cap.

12. Disconnect the extension spring from the chart wheel motor bracket.

13. Unscrew and remove the (square drive) square shaft end screw and the washer.

14. Remove the chart wheel lifter arm from the square shaft.

15. Gently slide the square shaft to the left, about two inches.

16. Remove the two O-Rings from the right side of the square shaft.

17. Slide the two chart wheels to the right side of the square shaft.

18. Remove the chart wheels.

19. Make sure that the thick side of each new chart wheel is closer to the end plates of the Signature5000. The narrow side of each chart wheel should face the center of the Signature5000.

20. Slide the new chart wheels onto the right side of the square shaft.

21. Install new O-Rings (or re-install the old O-Rings) on the right side of the square shaft.

22. Wrap one layer of transparent tape around each end of the square shaft.

23. Gently slide the square shaft back into place.

24. Use the 9/64 T-handled hex driver to re-install the (square drive) square shaft screw and washer at the right end plate of the Signature5000. Do not tighten the right end square shaft screw. Leave it connected but loose. Leave the 9/64 T-handled hex driver in place, pressed into the square shaft screw.

25. Re-install the left end (square drive) square shaft washer and end screw. Tighten this screw, leaving approximately .015 inch end play.

26. Tighten the right end square shaft screw.

27. Reconnect the extension spring to the chart wheel motor bracket.

28. Remove the 9/64 T-handled hex driver from the right end of the Signature5000.

29. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.

30. Re-install the four screws, spaced evenly along the bottom front edge of the Signature5000.

31. Re-install the left and right end caps and reconnect the power cord and interface cables.

Chart Tape Replacement

Follow this procedure to replace the chart tape.

1. Turn off the Signature5000 and disconnect the power cord.
2. Use an Exacto knife to pull up one corner of the old chart tape.
3. Firmly grip the pulled up corner and then remove the old chart tape by peeling it out of the molded groove on the platen of the Signature5000.
4. Pull a strip of new chart tape off the roll. Make sure that this strip of tape is slightly longer than the length of the platen.
5. Carefully press the new chart tape into the molded groove, behind the air holes, in the platen. Make sure that you don't cover the air holes.
6. Trim the excess tape from the ends of the platen.
7. Reconnect the power cord and turn on the Signature5000.

ELECTRICAL SUBSYSTEM

The electrical subsystem provides power to the other subsystems. There is one assembly replacement procedure for this subsystem: power supply replacement. Refer to the power supply test to help you determine whether the power supply has failed (see Figure 3-10).

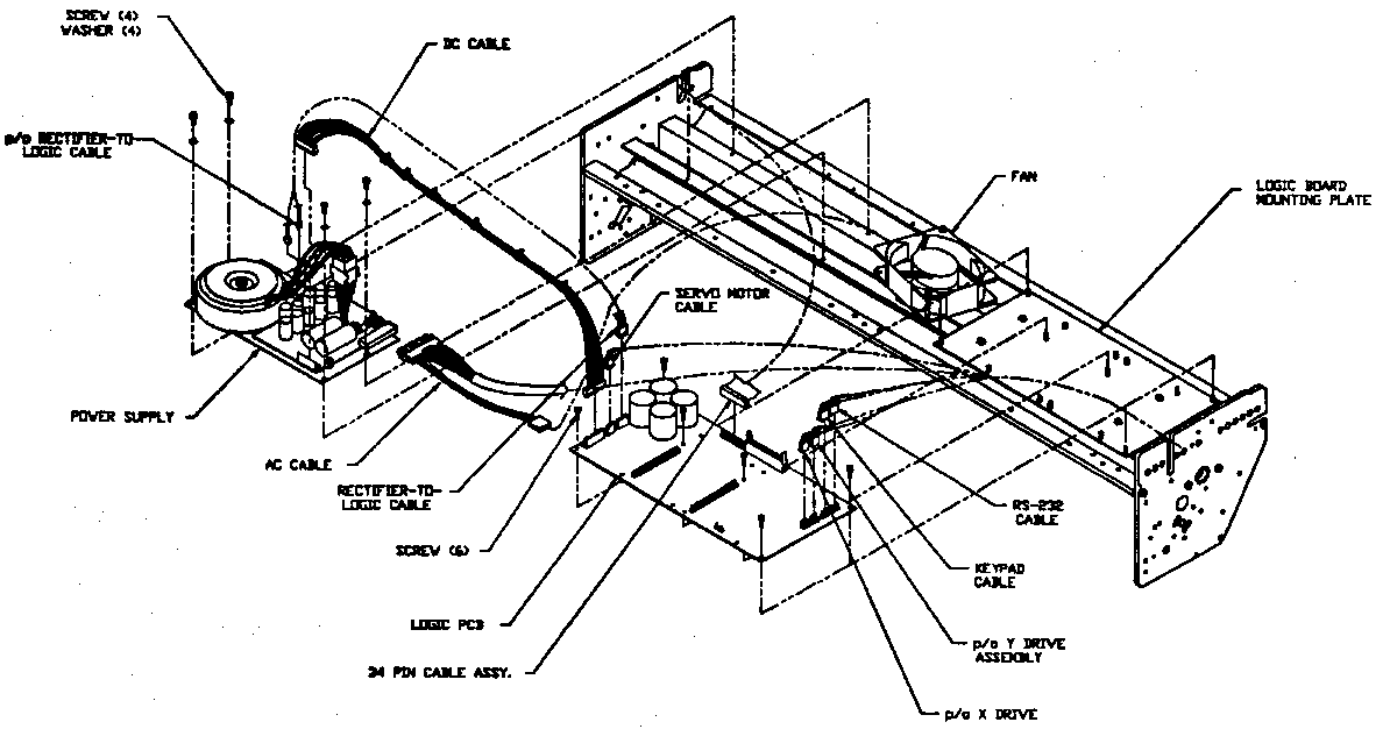


Figure 3-10 The power supply and logic board

Power Supply Test

Follow this procedure to test the power supply.

1. Turn on the Signature5000.

2. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.

3. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

4. Visually inspect the Signature5000 power supply for burn marks and sniff the air near the power supply. If you see any burn marks or notice an acrid odor, this may mean that the power supply has burned out and must be replaced. If everything seems alright, continue with the power supply test.

5. Turn on the voltmeter and use the test probes to check for the following voltage settings. If any of the settings are more than 5% off, replace the power supply.

Note: The power supply connector colors refer to the color of the wire that runs into each power supply connector.

- Insert the black (negative) test probe in the black power supply connector (J-3) and the red (positive) test probe in the yellow power supply connector. The voltmeter reading should be 33 +/- 5%.
- Insert the black (negative) test probe in the black power supply connector (J-3) and the red (positive) test probe in the white power supply connector. The voltmeter reading should be 14 +/- 5%.
- Insert the black (negative) test probe in the black power supply connector (J-3) and the red (positive) test probe in the green power supply connector. The voltmeter reading should be -12 +/- 5%.
- Insert the black (negative) test probe in the black power supply connector (J-3) and the red (positive) test probe in the blue power supply connector. The voltmeter reading should be 12 +/- 5%.
- Insert the black (negative) test probe in the black power supply connector (J-3) and the red (positive) test probe in the black power supply connector. The voltmeter reading should be 0 +/- 5%.
- Insert the black (negative) test probe in the black power supply connector (J-3) and the red (positive) test probe in the red power supply connector. The voltmeter reading should be 5 +/- 5%.
- Insert the black (negative) test probe in the black power supply connector (J-5) and the red (positive) test probe in the black power supply connector. The voltmeter reading should be 20 +/- 5%.

Power Supply Replacement

Follow this procedure to replace the power supply.

> *Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.*

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.
4. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.
5. Remove the AC-to-power supply cable.
6. Remove the AC-to-transformer connector.
7. Cut the cable ties.
8. Remove the power supply-to-motherboard connector.
9. Remove the red and black, twin wire, rectifier-to-motherboard cables.
10. Remove the four button head screws that hold the power supply assembly to the frame of the Signature5000.
11. Use the four button head screws to install the new power supply assembly to the frame of the Signature5000.
12. Reconnect the red and black, twin wire, rectifier-to-motherboard cables.
13. Re-install the power supply-to-motherboard connector.
14. Re-install the AC-to-transformer connector.
15. Reconnect the AC-to-power supply cable.
16. Install new cable ties.
17. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.
18. Re-install the four screws, spaced evenly along the bottom front edge of the Signature5000.

19. Reconnect the power cord and interface cables.

ELECTRONIC SUBSYSTEM

The electronic subsystem controls the other Signature5000 subsystems. There are two assembly replacement procedures for this subsystem: motherboard replacement and keypad replacement. The motherboard test will help you determine whether the motherboard has failed.

Motherboard Test

If you are repeatedly getting either of these error messages on the keypad LCD:

```
"Y AXIS JAMMED—"
"Press a key—"

"X AXIS JAMMED—"
"Press a key—"
```

the actual position of either the pen carriage (Y-axis) or the grit shaft (X-axis) differs from the commanded position. This may be caused by a media jam, a motor problem, or a failure of the motherboard. Use the Y-axis and X-axis motor test procedures, earlier in this manual, to determine whether the error message is being caused by a media jam or by a motor failure. If you continue to get either error message after clearing any media jams and adjusting or replacing the transmission assemblies, replace the Signature5000 motherboard.

Motherboard Replacement

Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.

Note: Mark the locations of all the motherboard connectors before you disconnect any of them. This will make it much easier to correctly install the connectors on the new motherboard.

Follow this procedure to replace the motherboard.

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.
4. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.

5. If you have a tangential cutter daughterboard installed, remove it by unscrewing the four 4-40 mounting screws that fasten the daughterboard to the motherboard.

6. Gently pull the daughterboard 64-pin receptacle away from the motherboard 64-pin connector.

7. Remove the daughterboard. Place it on a static-free surface.

8. Disconnect and mark the eight cable connectors that are plugged into the motherboard.

9. Unscrew and remove the six screws that hold the motherboard to the motherboard mounting plate.

10. Remove the motherboard.

11. Install the new motherboard to the motherboard mounting plate.

12. Connect the eight cable connectors to the new motherboard.

13. Re-install the tangential cutter daughterboard (if necessary).

14. Make sure that all wires and cables are out of the way and then carefully close the Signature5000.

15. Re-install the four screws, spaced evenly along the bottom front edge of the Signature5000.

16. Reconnect the power cord and interface cables.

Keypad Replacement

Follow this procedure to replace the keypad (see **Figure 3-11**).

> *Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any built up static electricity by touching a piece of grounded metal before you touch an electronic assembly. Touch the grounded metal several times during this procedure.*

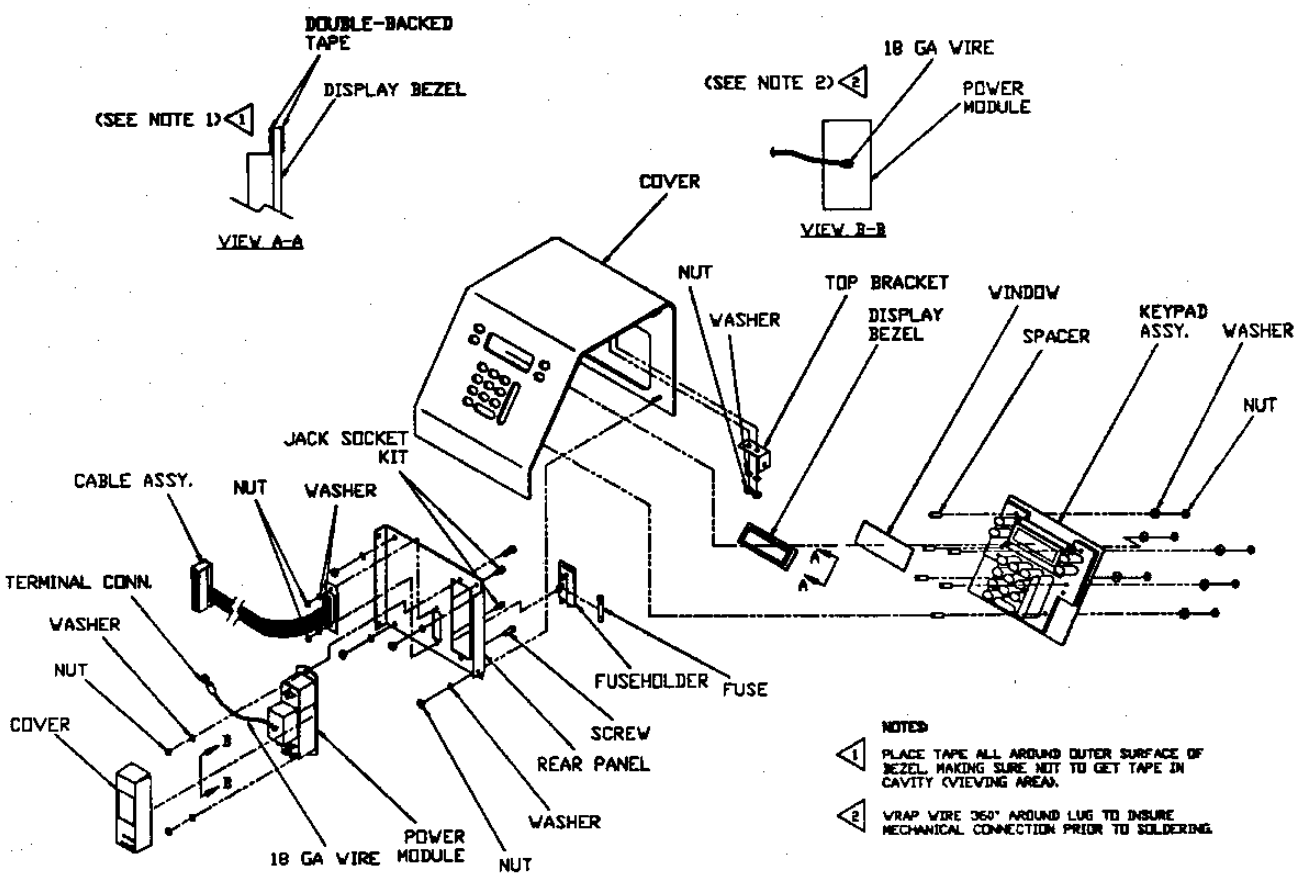


Figure 3-11 The keypad

1. Turn off the Signature5000 and disconnect the power cord.
2. Disconnect any interface cables.
3. Unscrew and remove the three screws that hold the right end cap to the Signature5000 and remove the right end cap.
4. From the front of the plotter, locate the four screws spaced evenly along the bottom front edge of the Signature5000.
5. Using a Phillips screw driver, unscrew and remove these four screws and carefully tilt the plotter unit up and back on its hinges.
6. Cut the cable ties from the serial cable that runs from the J-8 position on the motherboard to the keypad assembly.
7. Remove the serial cable from the J-8 position on the motherboard.
8. Remove the nut and star washer that connects the two green ground wires to the rear panel of the Signature5000.

9. Remove the five cable connectors from the rear entry module. Note the positions of these cable connectors (by color) for later re-installation.

10. Remove the gray ribbon cable from the keypad assembly.

11. Remove the two screws from the bottom of the keypad assembly. These screws hold the top right cover to the front of the Signature5000.

12. Make sure that all wires, cables and hardware are out of the way and then carefully close the Signature5000.

13. Remove the four screws that hold the top right cover to the right end plate of the Signature5000.

14. Gently lift the top right cover away from the Signature5000. Be careful to avoid cable snags as you lift the top right cover.

15. Set the top right cover, upside down, on a clean, dry, flat surface.

16. Remove the six nuts that secure the keypad assembly to the right top cover of the Signature5000. There are three nuts on each side of the keypad assembly.

Note: When you remove the keypad assembly, watch for the six plastic standoffs that may fall out. You will need these standoffs when you install the new keypad assembly.

17. Remove the old keypad assembly.

18. Use double-backed tape to reseat the six plastic standoffs on the right top cover of the Signature5000.

19. Hold the new keypad assembly against the six standoffs.

20. Re-install the six nuts that secure the keypad assembly to the right top cover of the Signature5000.

21. Re-install the top right cover on the Signature5000.

22. Reattach the four screws that hold the top right cover to the right end plate of the Signature5000.

23. Carefully tilt the plotter unit up and back on its hinges.

24. Reattach the two screws (at the bottom of the keypad assembly) that hold the top right cover to the front of the Signature5000.

25. Reattach the gray ribbon cable to the keypad assembly.

26. Re-install the five cable connectors to the rear entry module. Make sure that you install these cable connectors in the correct positions.

27. Re-install the nut and star washer that connects the two green ground wires to the rear panel of the Signature5000.

28. Re-install the serial cable at the J-8 position on the motherboard.

29. Install new cable ties for the serial cable that runs from the J-8 position on the motherboard to the keypad assembly.

30. Make sure that all wires, cables and hardware are out of the way and then carefully close the Signature5000.

31. Re-install the four screws in the bottom of the Signature5000.

32. Re-install the right end cap of the Signature5000 and reconnect the power cord and interface cables.

4

SIGNATURE5000 MAINTENANCE AND ADDITIONAL TROUBLESHOOTING

Preventive maintenance procedures should be performed regularly. The other items in this chapter are troubleshooting procedures that aren't covered in Chapter 2.

PREVENTIVE MAINTENANCE PROCEDURES

Cleaning the Grit Shaft

Clean the grit shaft in the following manner (see Figure 4-1).

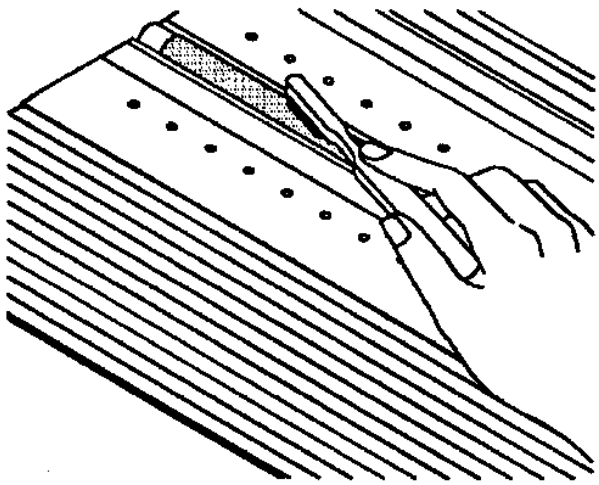


Figure 4-1 Cleaning the grit shaft

1. Turn off the Signature5000 and disconnect the power cord.
2. If you have a pen changer rail installed, rotate it to the up position.
3. Using a soft bristle toothbrush, remove any accumulated dust and media residue from the grit shaft.
4. When you have finished cleaning the grit shaft, gently lower the pen changer rail to the down position.

Cleaning the Pen Lift Rods

Clean the pen lift rods in the following manner (see Figure 4-2).

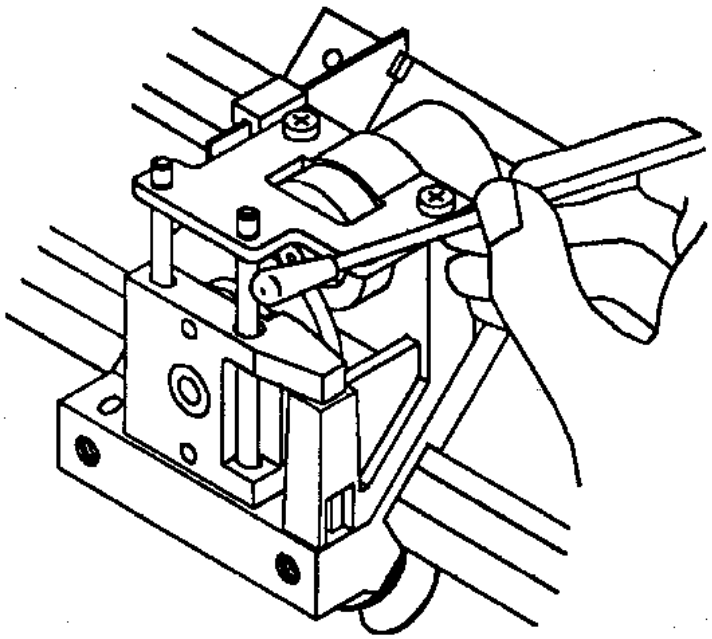


Figure 4-2 Cleaning the pen lift rods

1. Turn off the Signature5000 and disconnect the power cord.
2. Lift open the dust cover.
3. If you have a pen changer rail installed, rotate it to the up position.

➤➤**WARNING: The pen changer rail can pinch your fingers if it drops down. Keep your hands away from the platen when raising or lowering the pen changer rail.**

4. Cover the platen with a sheet of paper to prevent clogging the platen and grit shaft with falling debris.
5. Dampen a cotton swab with isopropyl (pharmacy) alcohol and gently wipe the surfaces of the pen lift rods until any accumulated residue has been removed.
6. When you have finished cleaning the pen lift rods, remove the sheet of paper covering the platen and gently close the dust cover and lower the pen changer rail to the down position.

Cleaning the Ribbon Cable

Clean the ribbon cable in the following manner (see Figure 4-3).

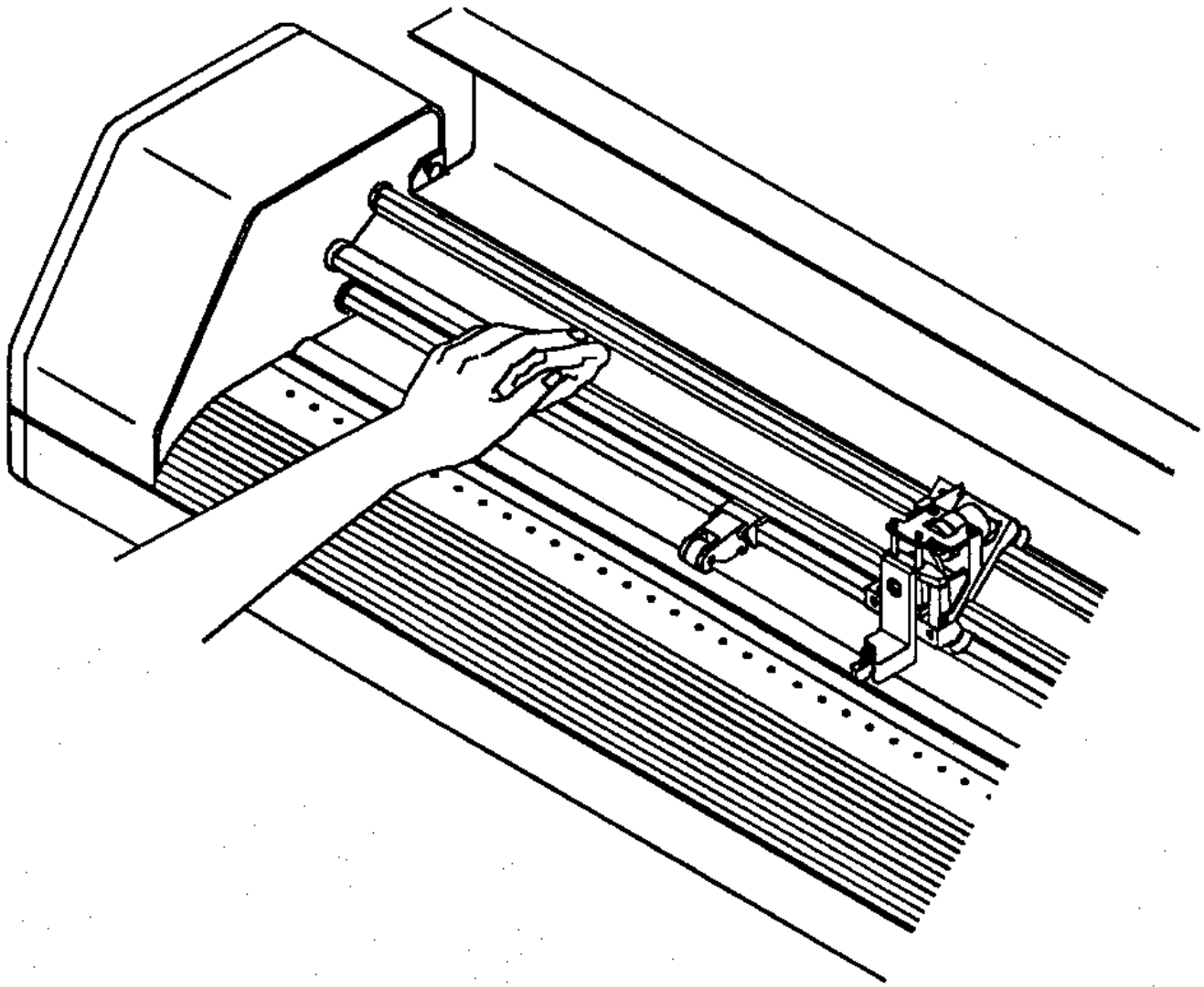


Figure 4-3 Cleaning the ribbon cable

1. Turn off the Signature5000 and disconnect the power cord.
2. Lift open the dust cover.
3. Dampen a lint-free cloth with isopropyl (pharmacy) alcohol and gently wipe the ribbon cable until any accumulated dust and debris has been removed.
4. Lower the dust cover.

Cleaning the Traverse Rods and Rollers

Clean the traverse rods and the rollers in the following manner (See Figure 4-4).

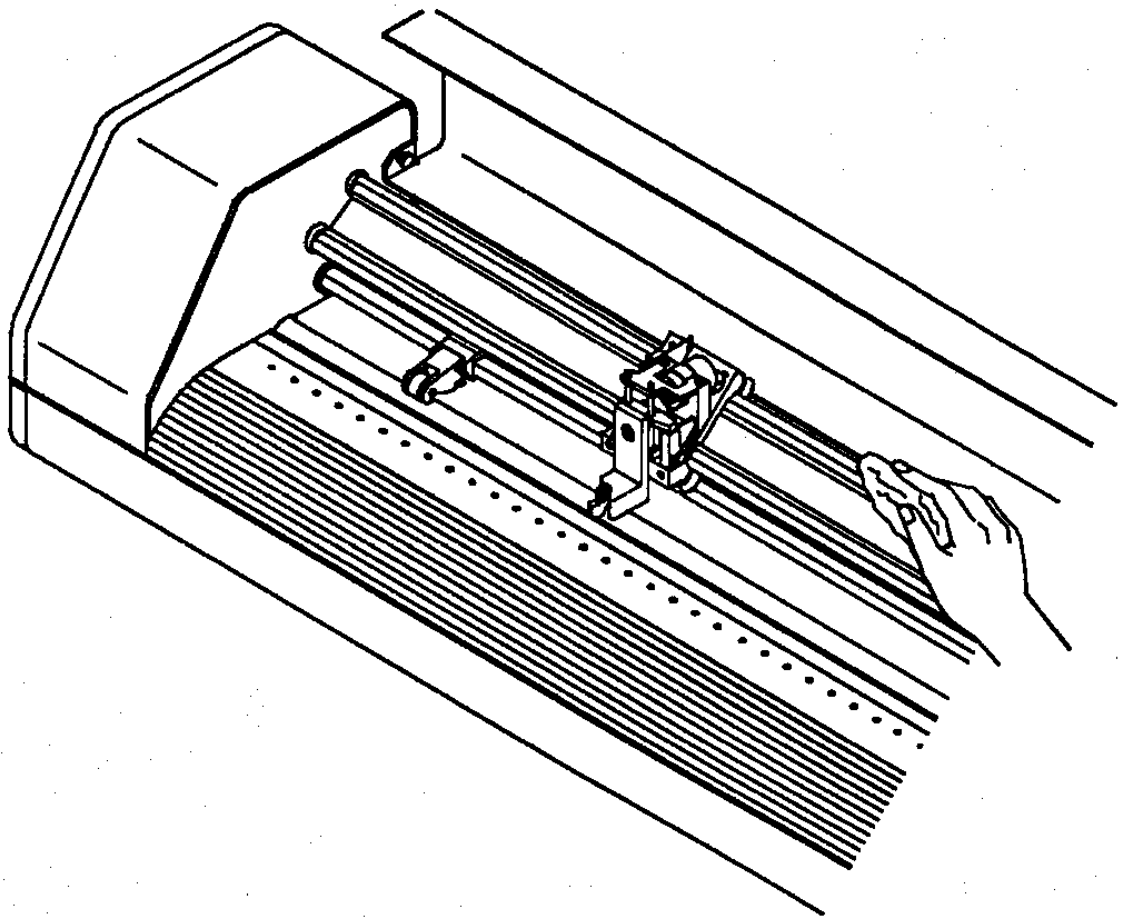


Figure 4-4 Cleaning the traverse rods and rollers

1. Turn off the Signature5000 and disconnect the power cord.
2. Lift open the dust cover.
3. Dampen a lint-free cloth with isopropyl (pharmacy) alcohol and gently wipe the traverse rods and the rollers until any accumulated dust and debris has been removed.
4. Lower the dust cover.

Cleaning the Platen

Clean the platen in the following manner.

1. Turn off the Signature5000 and disconnect the power cord.
2. If you have a pen changer rail installed, rotate it to the up position.

➤➤**WARNING: The pen changer rail can pinch your fingers if it drops down. Keep your hands away from the platen when raising or lowering the pen changer rail.**

3. Dampen a lint-free cloth with isopropyl (pharmacy) alcohol and gently wipe the platen until any accumulated dust and media residue has been removed.

4. Gently lower the pen changer rail to the down position.

LOSS OF REGISTRATION

The underside of a completed plot will always have two visible grit tracks where the chart wheels hold the media against the grit shaft. The chart wheel pressure on the grit shaft creates an impression on the plot media. By comparing these tracks you can determine whether the Signature5000 is having a loss of registration problem. The grit tracks should be identical.

If one grit track is more pronounced than the other, or if one grit track has a markedly different pattern than the other, you need to correct the problem.

You may be able to correct a loss of registration problem by adjusting, from the keypad, the Signature5000 pen settings for speed and acceleration. Before you adjust any keypad settings, consider these possibilities:

- Inspect the plot media for wrinkles or folds. Never use any media that is folded, wrinkled, or torn in any way. Allow the media to stabilize (temperature and humidity) prior to plotting.
- Check the size of the plot media. If you are executing large plots, use only high quality, stiff, flat, and stable media. Large plots tend to be more susceptible to loss of registration because of the greater distance between the chart wheels and because they require more grit shaft force.
- A sudden shift of plotted data may be the result of changing to or from a pen that is not concentric to its barrel. Check the pen tip for damage. In this situation there would be no change in the grit tracks on the media.

If you've determined that you need to adjust the Signature5000 pen speed and acceleration settings to improve registration, perform this procedure:

1. Make sure that the main menu is displayed on the keypad LCD.

2. Press [F4] (arrow).

3. Press [F1] Setup.

4. Press [F3] Pens.

5. Press [F1] Speed.

6. Using the numerical keys, enter a lower number (by two or three) than the displayed value. The pen speed default is 24 ips (inches per second) or 61 cm/s (centimeters per second).

7. Press the [ENTER] key.

8. Press [F2] Accel.

9. Using the numerical keys, enter a lower number than the displayed value. The pen acceleration default is 2 g.

10. Press the [ENTER] key.

11. Press the [EXIT/CANCEL] until the main menu appears on the keypad LCD.

POOR LINE QUALITY - PEN RELATED

If the plot line quality is uneven, follow these procedures to determine the cause:

1. Turn off the Signature5000 and disconnect the power cord.

2. Inspect the pens to determine whether they are empty or low on ink, or if the ink has dried since the pens were last used. Replace any defective or empty pens. Pens are usually shipped with a data sheet that has the manufacturer's recommended speed and force settings. Refer to this data sheet for the correct settings for a particular pen. Sometimes this data is only available in the manufacturer's catalog. Contact the pen supplier.

3. Check for excessive play in the pen jaw mounting plate. Carefully tighten the pen holder mounting screw if it is loose.

TORN MEDIA

If the media tears when you try to execute a plot file with a fine-tipped pen, you may need to lower the pen force setting from the Signature5000 keypad. Smaller pen points require lower pen force settings. Lower the pen force setting by performing this procedure:

1. Make sure that the main menu is displayed on the keypad LCD.

2. Press [F4] (arrow).

3. Press [F1] Setup.

4. Press [F3] Pens.

5. Press [F4] (arrow).

6. Press [F3] Force.

7. Using the numerical keys, enter a lower number than the displayed value. The pen force default is 24 g (grams).

8. Press the [ENTER] key.

9. Press the [EXIT/CANCEL] key until the main menu is displayed on the keypad LCD.

POOR LINE QUALITY

If you are having line quality problems, you may need to adjust the pen delay setting. The pen delay setting on the Signature5000 keypad controls the amount of time, in milliseconds, the Signature5000 pauses after lifting or lowering the pen. Generally, a shorter pen delay setting will result in faster pen movement and shorter plot time but may reduce line quality. The ideal pen delay setting is between 0 and 50 milliseconds for the pen-up delay and between 6 and 50 milliseconds for the pen-down delay. The pen-up delay default is 0. The pen-down delay default is 6.

1. Make sure that the main menu is displayed on the keypad LCD.

2. Press [F4] (arrow).

3. Press [F1] Setup.

4. Press [F3] Pens.

5. Press [F4] (arrow).

6. Press [F2] Delay.

   The first displayed value will be the pen-up delay setting.

7. Using the numerical keys, enter the pen-up delay value that you want to enter.

8. Press the [ENTER] key.

9. Press [F2] Delay.

10. Using the numerical keys, enter the pen-down delay value that you want to enter.

11. Press the [ENTER] key.

12. Press the [EXIT/CANCEL] key until the main menu is displayed on the keypad LCD.

TANGENTIAL CUTTER MAINTENANCE AND TROUBLESHOOTING

With the tangential cutter, you can solve many problems that you may encounter by following these troubleshooting procedures.

Blade Skipping/Tearing the Vinyl

If the blade is skipping or tearing the vinyl, it could be caused by any of the following:

- A small bit of vinyl or other foreign material sticking to the blade, preventing it from turning freely. Inspect the blade with a magnifying glass and carefully remove any foreign material.
- A dull or broken blade. Use a magnifying glass to examine the blade for broken tips or edges. If it is damaged, remove the blade and replace it with a new one.
- A lift angle value that may be set at a larger degree than you need. Reset the lift angle adjustment.
- A step time value that may be set too low (not enough torque). Increase the step time adjustment.
- Cutter foot burrs or nicks. Replace the tangential cutter.

Corners Not Closing

If the corner cuts do not close, try the following procedures:

1. Set the overcut adjustment to a larger value.
2. Adjust the up and down delay settings, giving the cutter more time to settle into the vinyl (down), or remove itself from the vinyl (up) before moving on.

Blade Cuts Media Backing

If the blade cuts the backing material evenly, the blade may be set too low. Raise the blade in the following manner:

1. Firmly grasp the cutter foot between your fingers.
2. Hold the depth adjustment knob with your other hand.
3. Make the blade recede and cut more shallowly by turning the depth adjustment knob counterclockwise.

The Vinyl is Unevenly Cut

If the blade skis over the vinyl or doesn't cut evenly, the blade depth may be too shallow. Adjust the blade depth in the following manner:

1. Firmly grasp the cutter foot between your fingers.
2. Hold the depth adjustment knob with your other hand.

3. Make the blade protrude and cut more deeply by turning the depth adjustment knob clockwise.

If this does not solve the problem try the following:

- Increase the force adjustment setting.
- Adjust the up and down delay settings, giving the cutter more time (a larger delay value) to settle into the vinyl (down), or remove itself from the vinyl (up), before moving on.
- Decrease the speed setting so the blade will not lift out of the vinyl at all. This solution may help if you are performing extra high-speed cuts.
- Decrease the acceleration setting.
- If you are cutting thick, hard vinyl using a 60-degree blade, change to a 45-degree blade.

The Vinyl Lifts or Pulls When Cutting Curves

If the vinyl sticks to the blade when the blade lifts on a curve, try the following:

- Reduce the lift angle setting.
- Reduce the motor speed (increase the step time adjustment value).
- Check the blade under a magnifying glass for nicks. Discard and replace it with a new blade if it is damaged or worn.
- If you are using a 30-degree angle blade, change to a 45-degree blade.

The following procedure pertains to the “Blue Logic Board” for the Signature 5000.

Sometimes, clearing the memory of the Signature 5000 will solve many problems totally unrelated to the memory. The following procedure will reset the plotter to factory defaults and will dump anything that might be causing the plotter to act differently than expected.

1. Move the carriage to the left end plate.
2. Turn plotter off.
3. Remove the 4 screws in the front and underneath the plotter.
4. The unit is hinged at the back, so tilt it open.
5. On the main logic board, locate JP2, which is marked clr/run.
6. Jumper the left and middle posts together.
7. Turn machine on.
8. Watch the carriage move to the right. Turn the machine off when the carriage reaches the right end plate.
9. Remove the jumper from JP2.

The memory of the plotter is now reset to factory defaults.

Most commonly, Ioline plotters are used with signmaking software, which provides drivers for most if not all Ioline plotters ever manufactured (Ex: CASmate; Flexisign; Signlab). In the event your design software relies on a windows driver for output to your plotter, an emulation driver can be used. Ioline plotters will emulate HP 7585 B drafting plotters. Using this driver requires adjustment of the origin location and panel size in the plotter memory through the keypad menu of the Signature 5000.

To install an HP 7585 B Series printer driver in Windows 95/98:

1. Click on the Start button to display the start menu.

2. Highlight Settings then click on Printers.

3. Click on the Add Printer icon in the Printers window. The Add Printer Wizard window should appear.

4. Click on Next >.

5. Select local printer then click Next >.

6. Select HP from the Manufacturers list then select 7585 B from the Printers list.

7. Click on Next >.

8. Select the appropriate output serial port you will be using in you computer (Ex: COM1; COM2; LPT1 [Smartrac Only]).

9. Click on Next >.

10. Select a name for the printer (Ex: Studio 7; Studio 8; Super 88; Smartrac) or keep the default name displayed, then decide whether you want this to be your default printer and choose Yes or No.

11. Click Next >.

12. Choose whether you would like to print a test page (not required). Choose “No” since your Ioline plotter is not yet setup to accommodate the HP 7596 center origin position required by the HP 7585 B driver.

13. Click Finish.

14. Driver installation is complete and the printer driver icon should appear in the Printers window.

15. Right click on the printer icon then left click on properties from the pull down menu.

16. Click on the Paper tab at the top of the window.

17. Select the paper size that equals the page size most commonly used in your Ioline plotter then choose landscape to mirror the media orientation of the Ioline plotter.

18. Click OK.

19. Driver setup is complete.

To adjust plotter parameters for origin location and panel size:

1. Turn on your Ioline plotter.

2. Press any key on the plotters' keypad to initialize.

3. From the main menu press F4 →, F1 <Media>, F1 <Std Size>, select your media size to mirror the paper size set in the HP 7585 B driver, press exit 2 times, press F4 →, press F2 to change plotter language to HPGL (if HPGL already is selected move to next step, press F4 →, F1 <Enable>, F4 → twice, F2 to change Emul to HP7596 to change origin to center.

4. Origin location and panel size have been changed to accommodate the HP 7585 B driver.

1. Check for flat spots on chartwheels. Flat spots will allow the media to slip during movement.

2. Check that the 4 Allen screws on the gritshaft are fastened securely.

3. Assure that the square shaft has no side to side play. If play exists, remove the left end cover; tighten the hex screw (5/32) until the square shaft is secure. Do not overtighten, as this may cause the chartwheels to jam in the up/down position.

4. Try slowing the speed of the plot and decreasing the acceleration. Some materials, especially metallic vinyls, will not track well at 24 inches per second. The factory defaults on your Signature 5000 are 24 inches per second and 2 G's of acceleration. Cut these in half. A step by step procedure on how to change the speed and acceleration is shown on page 7-9 of your owner's manual.

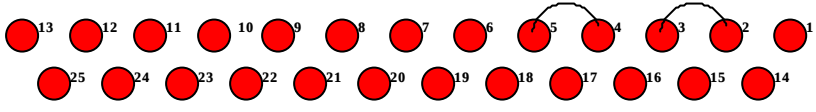
5. Clean the grit shaft by removing any accumulation of residue build up which may cause tracking problems or slipping of the media. A clean grit shaft should make a distinct track on the backing of your material. The grit tracks should be identical. If you only see one track, or if the tracks are not even, the chart wheels may need to be replaced.

6. If your chart wheels are always used in the same position, the grit shaft may be excessively worn in that position. Try another chartwheel placement.

7. Adjust the down pressure of the chartwheels.

1. Turn off the Signature 5000 and remove the serial cable from the back of the plotter.

2. Using paperclips or short lengths of wire, jumper pins 2 to 3 and 4 to 5. Make sure you get the wires in far enough to make a good connection. The pinholes are labeled on the plotters serial port hardware. The top row is 1 through 13, from right to left, so the pins to jumper are:



3. Turn on the Signature 5000. From the main menu, get into the Serial Test Mode by pressing the following keys: -->, Action, Test, -->, -->, Serial.

4. Press the “F1” key and verify that the character transmitted equals the character received. Press the “F3” key and verify that the handshake lines toggle.

5. Turn off the Signature 5000 after the test. This will take the plotter out of the diagnostic mode.

6. Remove the jumpers from the serial port.

If this test passes, then the serial port of the plotter is communicating properly.

Sometimes, finding the exact combination of down-force, pen delays, speed and acceleration is difficult. Different thicknesses of paper or vinyl may require modifying the factory settings. While the Signature 5000 will work with many available materials, you will eventually find a media that does not cut well or plot well. Try these solutions to improve plot quality:

UNEVEN, DISTORTED OR SKIPPING LINE QUALITY: Excessive play or a cracked pen lift jaw mounting plate can cause skipping, distortion or uneven line quality. There is a mounting screw that tightens the mounting plate. Tighten this screw if loose or if you feel any play in the jaw. The screw is located on the lower left side of the mounting plate. If the skipping only occurs when you are plotting with pens, check to ensure there is ink in the pen and that the pen tip is not damaged. If you still experience distortion of line quality after performing the above adjustments, inspect the pen lift plate for cracks. The pen lift plate should be replaced if any cracks are found.

TORN MEDIA: If your media tears when you plot or if the blade randomly cuts too deep, this may be an indication to lower the force setting. From the keypad perform these procedures:

- Display Main Menu on your LCD.
- Press “F4” (arrow)
- Press “F1” (set up)
- Press “F3” (pens)
- Press “F3” (force)

Using the keypad, enter a lower number than the displayed value. The factory default is 24 grams. Enter a lower number until the media does not tear.

- Press “Enter”.
- Press “Exit/Cancel” three times to display the Main Menu.

CUTS ARE NOT COMPLETE: The pen delay settings on your plotter control the amount of time, in milliseconds, the plotter pauses before lifting or lowering the pen or blade. If the pen-down delay is too long or if the pen-up is too fast, your plot may not be complete. The correct setting for pen-down should be between 50 and 100 milliseconds. The correct pen-up should be between 10 and 50 milliseconds. If you

change to thicker material the delays should be changed. Thicker material will allow for slower pen-down delays because the pen or blade does not go as far to contact the media.

To change pen delays, perform these strokes from your keypad:

- Display Main Menu on the LCD.
- Press “F4” (arrow)
- Press “F1” (set-up)
- Press “F3” (pens)
- Press “F4” (arrow)
- Press “F1” (Pen Delay)

The first displayed value will be the pen-up setting. Using the keypad, enter a higher number that the one displayed. The factory default is 16.

- Press “F1” Pen Delay.

The second displayed value will be the pen-down setting. Enter a higher number if you get skipping; enter a lower number if your cuts are not complete. The factory default is 70.

- Press “Enter”.
- Press “Exit/Cancel” four times to return to the main menu.

By experimenting with these delays, you can get your plotter to complete almost any cut on any material commercially available.

DECREASE CUT DEPTH: Turning the foot of the cutting head counterclockwise decreases the depth of your blade cut. Turning this foot clock-wise will give you a shallower cut.

CHANGING PLOT SPEED AND ACCELERATION: Changing speed and acceleration will improve the quality of your plot. The default setting is 24 inches per second and some materials do not perform well at those speeds. To change the speed:

- Press “F4” (arrow)
- Press “F1” (set up)

- Press “F3” (pens)
- Press “F1” (speed)
- Using the keypad, enter a number less than 24 inches per second.
- Press “Enter”.
- Press “F2” (accel) then enter a number less than 2. (Try 1.0)
- Press “Enter”
- Press “Exit/Cancel” three times to return to main menu.

Technical Bulletin **Inconsistent Cutting Force / Signature 5000**

The following can cause inconsistent cutting pressure while cutting vinyl:

- Dirty Pen Lifter Plate Rods and/or Tangential Knife Shaft
- Weak Pen Lift Motor
- Worn out Tangential Knife Assembly
- Worn out Carriage Assembly

To assure optimal performance of your Signmaker 5000, clean the pen lifter plate rods and tangential knife shaft regularly. To clean, use a cotton swab with alcohol, and then apply a small amount of spray silicone for lubrication.

The following procedure pertains to the “Green Logic Board” for the Signature 5000.

Sometimes, clearing the memory of the Signature 5000 will solve many problems totally unrelated to the memory. The following procedure will reset the plotter to factory defaults and will dump anything that might be causing the plotter to act differently than expected.

1. Move the carriage to the left end plate, away from the keypad.

2. Turn plotter off.

3. Remove the 4 screws in the front and underneath the plotter.

4. The unit is hinged at the back, so tilt it open.

5. Locate and remove the ni-cad battery located at the lower right position of the logic board.

6. Press the tab that held the battery in place until it touches the surface below, and then replace the battery.

7. Next to the battery is JP4, Run/ClrMem jumper. Remove the jumper from JP4 and move it to the right and center posts then back to the original position.

8. Turn the plotter on.

The memory of the plotter is now reset to factory defaults.

From the Signature 5000s main menu *(New Plot, Continue, Charthold, →)* press:

1. F4 (arrow)
2. F1 (set up)
3. F1 (media)
4. F2 (low left)
5. F3 (custom)
6. The screen will show “X SIZE (MILS)”. From the keypad enter “162000” then press “ENTER”**.**
7. The next screen will show Y SIZE (MILS). From the keypad enter “35000” then press “ENTER”.
8. At this point, the gritshaft will start moving forward and then back.
9. Press “EXIT” until the main menu appears *(New Plot, Continue, Charthold, →).*
10. Press “NEW PLOT”.
11. Press “ENTER” to plot.

Now the plotter is set to cut 35 by 162 inches.

If you desire any other page size, just input the numbers as above. For example, if you want a custom page size of 24 inches (Y-axis) by 36 inches (X-axis) input 36000 for the X SIZE and 24000 for the Y SIZE.

In most cases, the following causes a cyclic motion of the chartwheels:

- Charthold lever arm does not make contact with the limit switch.
- Charthold motor cams loose on motor pin.
- Broken charthold arm lever.
- Defective charthold limit switch.
- Lower level component problem.

Charthold Limit Switch Adjustment

1. Remove left end plate
2. Verify charthold motor and limit switch cable connectors are connected to the ribbon cartridge PCB sockets.
3. Press F2 (charthold) to activate charthold motor movement.
4. Visually inspect the rotation of the cam to ensure it makes contact with the charthold lever arm. The cam is held to the motor pin with a 1/16" Allen screw.
5. Verify the cam pushes the charthold arm high enough to make contact with, and close the limit switch.
6. Adjust switch/motor position accordingly.

1. Turn on power and press a key to initialize plotter.

2. From the main menu, press “F4” Arrow.

3. Press “F3” Action.

4. Press “F2” Test.

5. Press “F4” Arrow.

6. Press “F3” Debug. Use the numerical keypad to enter the Debug Password: 192837

7. Press the “Enter” key.

8. Press “F1” ArbPrim. Use the numerical keypad to enter the ArbPrim number (Arbitrary Primitive): 198 press “Enter”.

9. Press the “Enter” key. You will see a blinking cursor on the first line of the keypad LCD.

10. Press the “Enter” key. You will see a blinking cursor on the second line of the keypad LCD.

11. Press the “Enter” key. Use this display to determine the correct pen height setting as you manually adjust the pen carriage potentiometer. The correct pen height setting is E6.

12. Make sure that no tools are attached to the pen lift plate (such as a pen or a tangential cutter) and then gently press the pen jaw (or cutter fork) assembly down as far as possible using just the weight of your finger.

13. While holding down the pen jaw (or cutter fork), use a small flat head screwdriver to twist the pen carriage potentiometer until the keypad LCD displays the following: PenHte6

Note: Twisting the pen carriage potentiometer clockwise will raise the number on the keypad LCD. Twisting the pen carriage potentiometer counterclockwise will lower the number

In most cases, the following causes baseline text to shift vertically (y-axis) using a normal lower left orientation:

- Loose y-axis drive belt.
- Loose y-axis motor gear.
- Ceased y-axis transmission bearings.
- Ceased carriage wheel bearings.
- Defective servo motor encoder.

Try the following to solve:

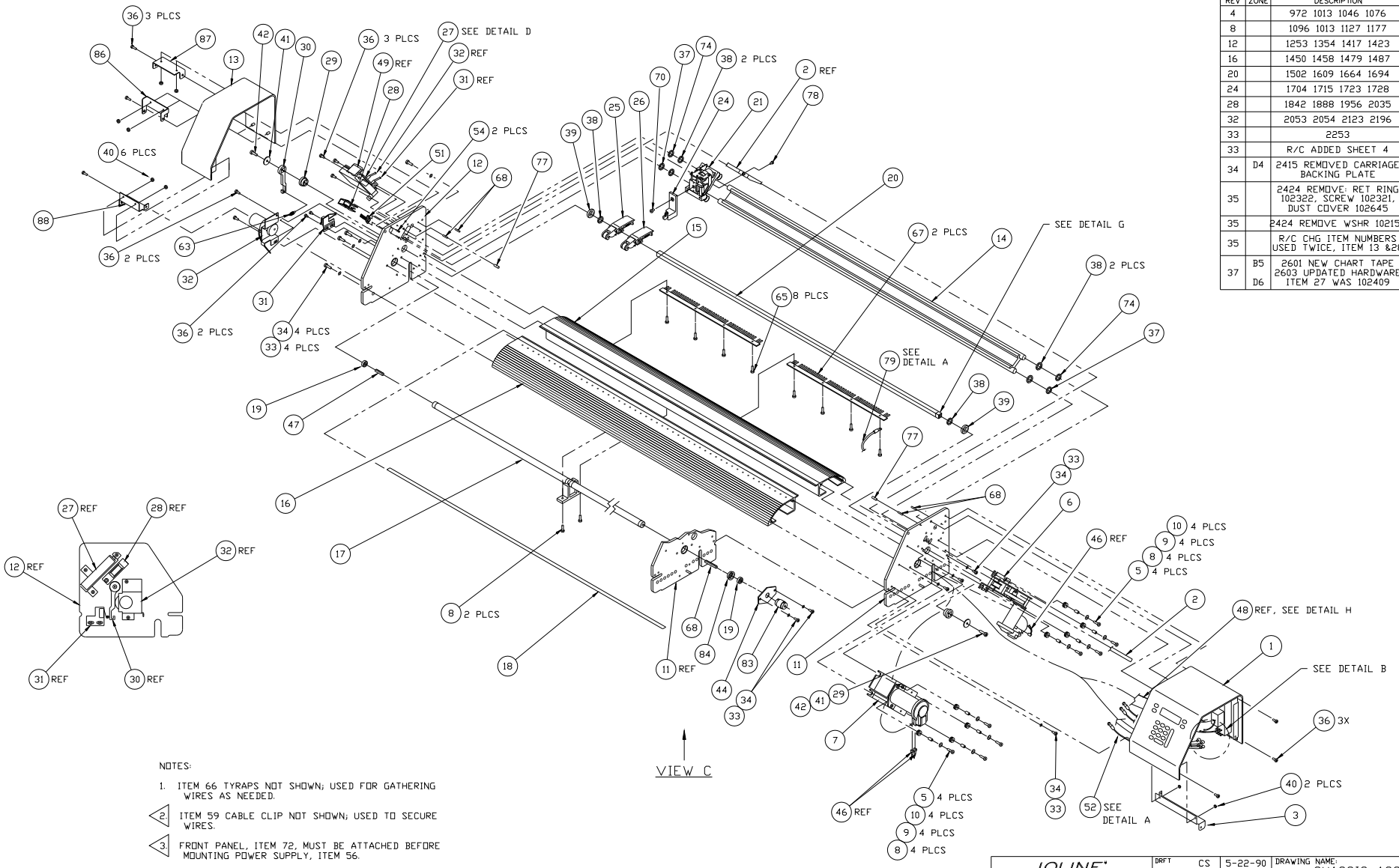
1. Tighten carriage drive belt.
2. Clean the traverse rods with alcohol and a clean cloth.
3. Carriage wheel bearings will sometime cease after extended use of the plotter.
    - Remove carriage-backing plate.
    - Remove the carriage from the traverse assembly of the plotter.
    - Make sure that the wheels rotate freely.
    - Replace the bearings and wheels if damaged.
4. Check pinion gear on the y-axis motor to assure the setscrews are fastened properly.
5. Check y-axis transmission bearings and gears for wear or damage.
6. Check the y-axis transmission to assure the gears are meshing properly.

APPENDIX

REFERENCE MATERIALS

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-02	LABOR, FRAME-UP	102418	CHASSIS ASSY, 5000
102396	COVER ASSY, RIGHT TOP	102418	CHASSIS ASSY, 5000
102382	BELT ASSY, Y-DRIVE	102418	CHASSIS ASSY, 5000
103839	BRACKET, FRONT	102418	CHASSIS ASSY, 5000
102945	GROMMET, VIB. DAMP., 0.563 OD, 0.21	102418	CHASSIS ASSY, 5000
103529	BRACKET, TRANSMISSION, UPPER, Y-DR	102418	CHASSIS ASSY, 5000
103494	TRANS ASSY, X-DRIVE, 1000 CT	102418	CHASSIS ASSY, 5000
103144	SPACER, .166X.250X.312, ALUM	102418	CHASSIS ASSY, 5000
103206	PLATE, END, RIGHT, 5000, PLAT WHT	102418	CHASSIS ASSY, 5000
103207	PLATE, END, LEFT, 5000, PLAT WHT	102418	CHASSIS ASSY, 5000
103927	COVER, LEFT TOP	102418	CHASSIS ASSY, 5000
102394	TRAVERSE ASSY, 38"	102418	CHASSIS ASSY, 5000
102981	PLATEN, REAR, LP5000	102418	CHASSIS ASSY, 5000
102377	PLATEN, FRONT, 5000	102418	CHASSIS ASSY, 5000
102419	GRIT SHAFT ASSY, X AXIS DRIVE	102418	CHASSIS ASSY, 5000
101062	TAPE, CUSHION, PEN, .437 WD	102418	CHASSIS ASSY, 5000
104471	TAPE, UHMW, .43 WIDE	102418	CHASSIS ASSY, 5000
100316	BEARING, BALL, .25ID, .625OD, .196	102418	CHASSIS ASSY, 5000
102616	SHAFT, SQUARE, 7/16 SQ X 39.05 LG	102418	CHASSIS ASSY, 5000
102393	CARRIAGE ASSY	102418	CHASSIS ASSY, 5000
102389	PEN HOLDER ASSY	102418	CHASSIS ASSY, 5000
101865	CHART WHEEL ASSY, RIGHT, TWO SPRING	102418	CHASSIS ASSY, 5000
104481	CARTRIDGE ASSY, METAL	102418	CHASSIS ASSY, 5000
103826	TENSIONER ASSY	102418	CHASSIS ASSY, 5000
104381	BUSHING, SQUARE SHAFT	102418	CHASSIS ASSY, 5000
102034	ARM, CHART HOLD LIFTER	102418	CHASSIS ASSY, 5000
102648	LIMIT SWITCH ASSY, CHART HOLD, LP50	102418	CHASSIS ASSY, 5000
102420	MOTOR ASSY, CHART HOLD	102418	CHASSIS ASSY, 5000
100126	O-RING, .364 ID X .070	102418	CHASSIS ASSY, 5000
100127	O-RING, .487 ID X .103	102418	CHASSIS ASSY, 5000
100128	O-RING, .539 ID X .210	102418	CHASSIS ASSY, 5000
100827	RETAINER BEARING, GRIT SHAFT, SERVO	102418	CHASSIS ASSY, 5000
102892	CABLE ASSY, SERVO MOTOR	102418	CHASSIS ASSY, 5000
102421	PIN, .249 DIA, 1.00 LG	102418	CHASSIS ASSY, 5000
102894	CABLE ASSY, 10 PIN COND	102418	CHASSIS ASSY, 5000
102897	CABLE ASSY, 34 PIN COND	102418	CHASSIS ASSY, 5000
102889	CABLE ASSY, RECTIFIER	102418	CHASSIS ASSY, 5000
102847	CABLE ASSY, MINI DIN RECEPTACLE, 10	102418	CHASSIS ASSY, 5000
100846	CABLE ASSY, 4000, AC POWER	102418	CHASSIS ASSY, 5000
103632	CABLE ASSY, 5000 DC POWER	102418	CHASSIS ASSY, 5000
102424	POWER SUPPLY ASSY	102418	CHASSIS ASSY, 5000
103987	PCB ASSY, 5000 LOGIC MOTHER BOARD,	102418	CHASSIS ASSY, 5000
102397	PLATE, MTG, LOGIC PCB	102418	CHASSIS ASSY, 5000

100279	CONN, CABLE CLIP	102418	CHASSIS ASSY, 5000
100453	FAN, COOLING, 110V	102418	CHASSIS ASSY, 5000
100108	SPACER, #8 CLR X 7/16 X 1/4 RND	102418	CHASSIS ASSY, 5000
100615	SPRING, EXTENSION, CHART HOLD IDLER	102418	CHASSIS ASSY, 5000
102633	BRUSH, STATIC, 13.55 LG	102418	CHASSIS ASSY, 5000
102959	PIN, .249 DIA, 1.50 LG	102418	CHASSIS ASSY, 5000
102422	BOTTOM PAN ASSY	102418	CHASSIS ASSY, 5000
102356	FRONT PANEL, PLAT WHT	102418	CHASSIS ASSY, 5000
103655	O-RING, .426 ID X .070	102418	CHASSIS ASSY, 5000
101864	CHART WHEEL ASSY, LEFT, TWO SPRING	102418	CHASSIS ASSY, 5000
103628	CABLE ASSY, GROUND, 10 INCH	102418	CHASSIS ASSY, 5000
100152	COUPLING, ASSY, FLEX	102418	CHASSIS ASSY, 5000
100555	ADAPTER, BEARING, X-AXIS DRIVE	102418	CHASSIS ASSY, 5000
103950	BRACKET, REAR	102418	CHASSIS ASSY, 5000
103951	BRACKET, TOP	102418	CHASSIS ASSY, 5000
103952	BRACKET, FRONT	102418	CHASSIS ASSY, 5000
103908	SCREW #8-32, .50 LG, PHP SEMS	102418	CHASSIS ASSY, 5000
100111	SPACER, .254ID, .375OD, .030LG, GOL	102418	CHASSIS ASSY, 5000
100056	SCREW #10-24, .75 LG, PH SQ DR	102418	CHASSIS ASSY, 5000
100095	WSHR, #10, LOCK, EXT STAR	102418	CHASSIS ASSY, 5000
100087	WSHR, #8, LOCK, EXT	102418	CHASSIS ASSY, 5000
104007	SCREW #8-32, .312 LG, PHP SEMS	102418	CHASSIS ASSY, 5000
104012	NUT, #6-32, KEP	102418	CHASSIS ASSY, 5000
100099	WSHR, #10, .875OD, .06TH, FLAT	102418	CHASSIS ASSY, 5000
103772	SCREW #10-32, .625 LG, SHC, NYLOC	102418	CHASSIS ASSY, 5000
104013	NUT, #8-32, KEP	102418	CHASSIS ASSY, 5000
103407	SCREW #4-40, .50 LG, FHP, PLAT WHT	102418	CHASSIS ASSY, 5000
100045	SCREW #8-32, 2.25 LG, PHP	102418	CHASSIS ASSY, 5000
104337	SCREW #4-40, .375 PHP, SEMS	102418	CHASSIS ASSY, 5000
104180	SCREW, #8, .50 LG, SLF TAP, PHP, SE	102418	CHASSIS ASSY, 5000
100277	TYRAP, .1 IN X 3 IN	102418	CHASSIS ASSY, 5000
103876	PIN, DOWEL, .125 X .75 LG	102418	CHASSIS ASSY, 5000
104179	SCREW #10-32, .375 LG, PHP, SEMS	102418	CHASSIS ASSY, 5000
100079	SPACER, #4, .50 LG, NYLON	102418	CHASSIS ASSY, 5000
100020	SCREW #6-32, .187 LG, PHP	102418	CHASSIS ASSY, 5000



NOTES:

1. ITEM 66 TYRAPS NOT SHOWN; USED FOR GATHERING WIRES AS NEEDED.
2. ITEM 59 CABLE CLIP NOT SHOWN; USED TO SECURE WIRES.
3. FRONT PANEL, ITEM 72, MUST BE ATTACHED BEFORE MOUNTING POWER SUPPLY, ITEM 56.

REV	ZONE	DESCRIPTION	REV DATE
4		972 1013 1046 1076	9-4-90
8		1096 1013 1127 1177	1-21-91
12		1253 1354 1417 1423	1-21-91
16		1450 1458 1479 1487	2-7-91
20		1502 1609 1664 1694	5-20-91
24		1704 1715 1723 1728	5-20-91
28		1842 1888 1956 2035	10-31-91
32		2053 2054 2123 2196	3-20-92
33		2253	4-6-92
33		R/C ADDED SHEET 4	7-24-92
34	D4	2415 REMOVED CARRIAGE BACKING PLATE	9-1-92
35		2424 REMOVE: RET RING 102322, SCREW 102321, DUST COVER 102645	11-3-92
35		2424 REMOVE WSHR 102159	11-3-92
35		R/C CHG ITEM NUMBERS USED TWICE, ITEM 13 &28	11-23-92
37	B5 D6	2601 NEW CHART TAPE 2603 UPDATED HARDWARE ITEM 27 WAS 102409	3-11-93

-	-	-	33	37	37	37	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

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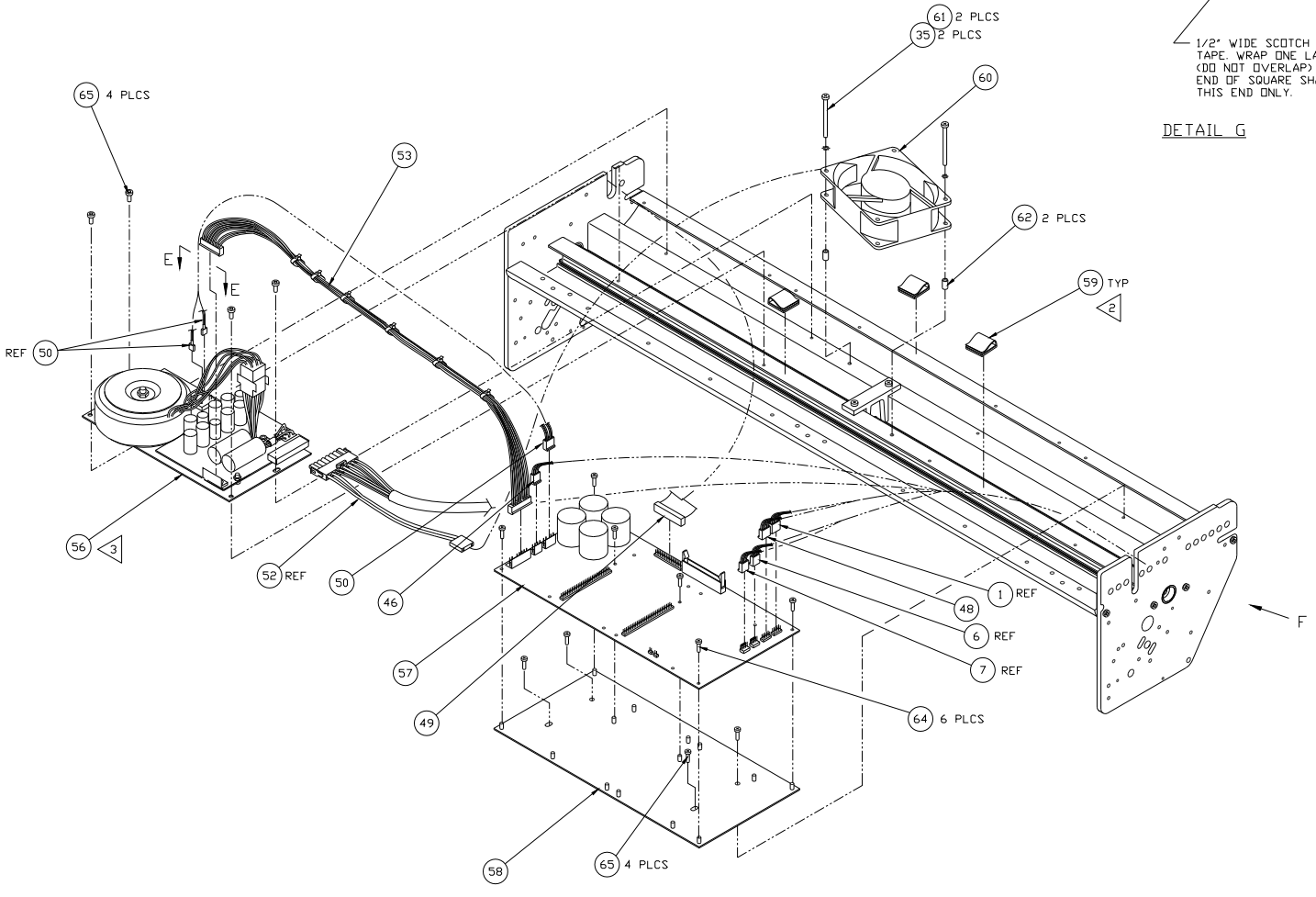
DRFT	CS	5-22-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	102418S1	

DRAWING NAME: CHASSIS ASSY, 5000

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± ° .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
37	1 OF 4	102418



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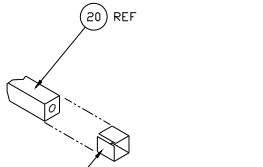

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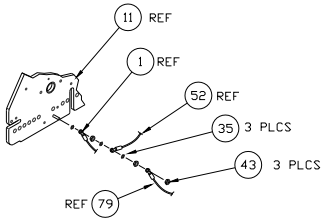

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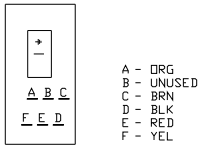

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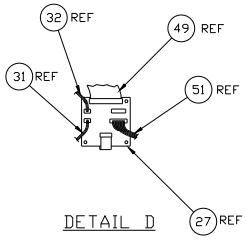

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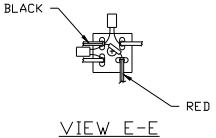

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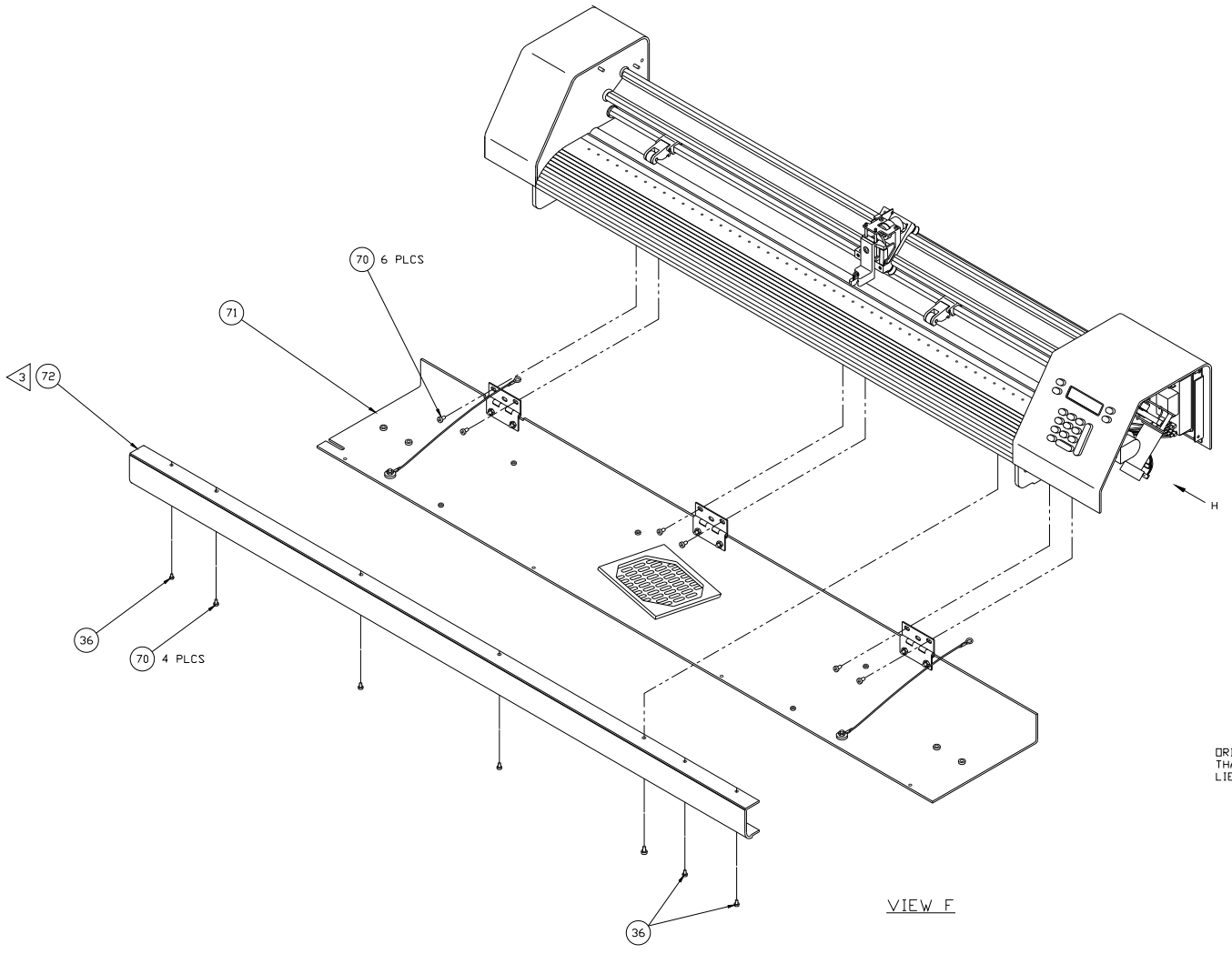
CHK					
APVD			REV.	Sheet No.	Dwg./Part No.:
File Name:	102418S2		37	2 OF 3	102418

IOLINE CORPORATION



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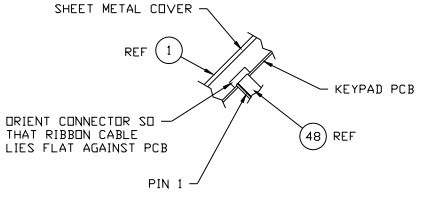

DETAIL H

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CHK					
APVD			REV	Sheet No.	Drawing/Part No.
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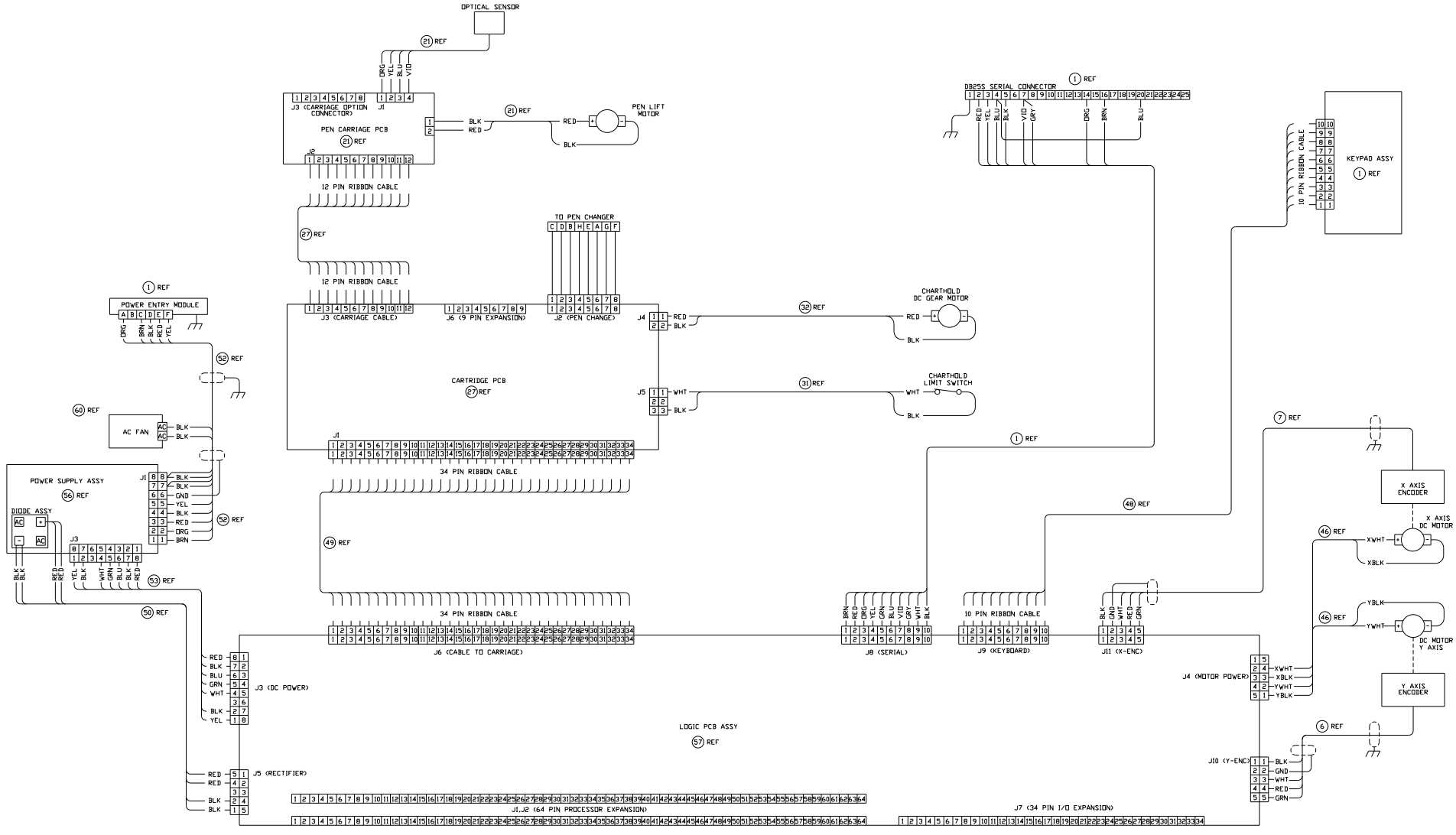
IOLINE CORPORATION



	By:	Date:	DRAWING NAME:
DRFT	SRS	7-23-92	CHASSIS ASSY, 5000, WIRING DIAGRAM
CHK			
APVD			
File Name:	102418S4		

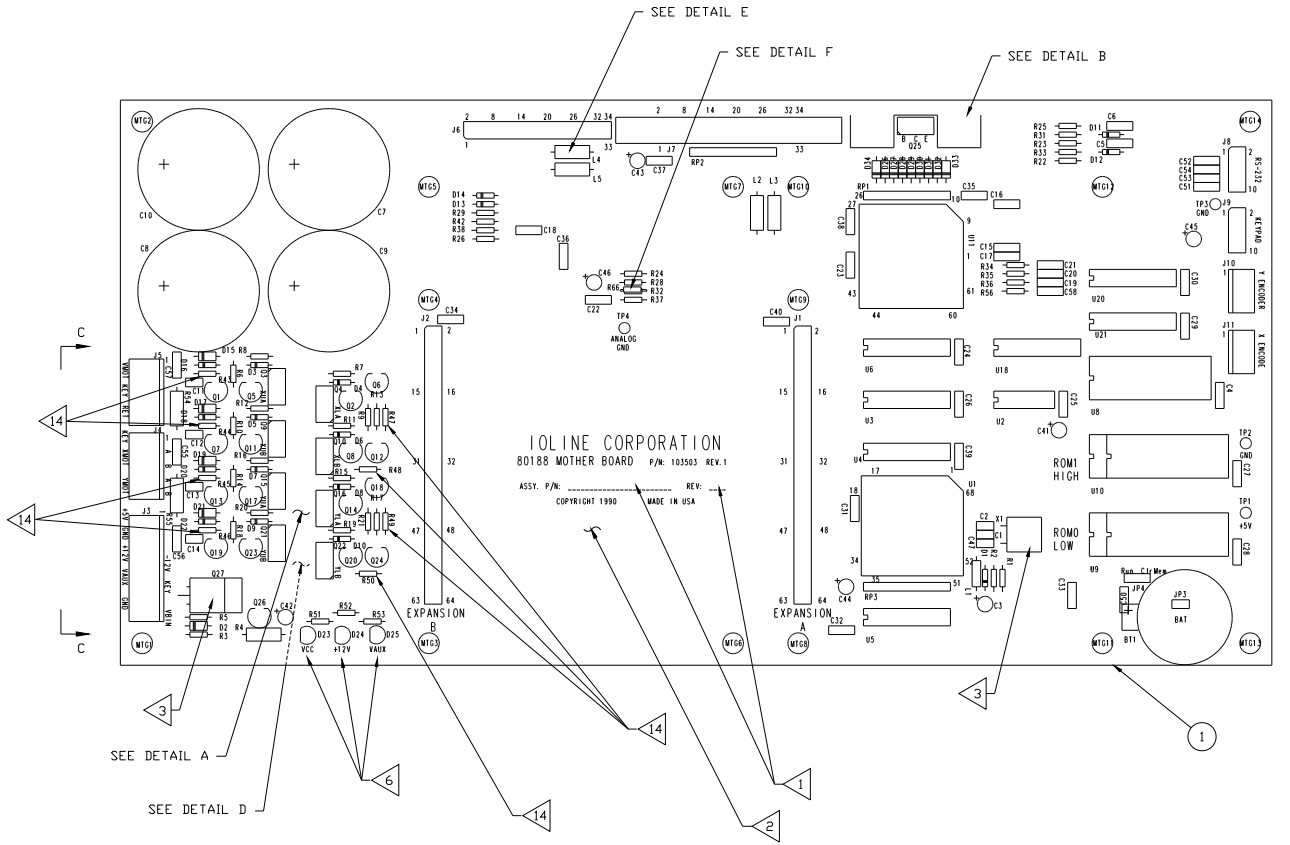
REV	Sheet No.	Drawing/Part No.
33	4	102418

IOLINE CORPORATION

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
100238	CONN, SHUNT, 2 PIN	103982	PCB ASSY, 80188 MOTHER BOARD
100260	CONN, HDR, 10 PIN, 2 X 5, MALE	103982	PCB ASSY, 80188 MOTHER BOARD
100335	RES, 100 OHM, 5%, 1/2W	103982	PCB ASSY, 80188 MOTHER BOARD
100336	RES, 1K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100342	RES, 220 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100343	RES, 2.2K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100344	RES, 270 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100346	RES, 33 OHM, 5%, 1/4 W	103982	PCB ASSY, 80188 MOTHER BOARD
100349	RES, 4.7K OHM, 5%, 1/4 W	103982	PCB ASSY, 80188 MOTHER BOARD
100350	RES, 510 OHM, 5%, 1/4 W	103982	PCB ASSY, 80188 MOTHER BOARD
100357	CAP, CERAMIC, MONO, .1UF, 50V, .2 L	103982	PCB ASSY, 80188 MOTHER BOARD
100361	CAP, CERAMIC, MONO, 100PF, 50V, .1	103982	PCB ASSY, 80188 MOTHER BOARD
100364	CAP, CERAMIC, MONO, 47PF, 50V, .1 L	103982	PCB ASSY, 80188 MOTHER BOARD
100371	TRANSISTOR, TIP 115 (CAN SUB 117)	103982	PCB ASSY, 80188 MOTHER BOARD
100373	TRANSISTOR, 2N4410, "MOTOROLA ONLY	103982	PCB ASSY, 80188 MOTHER BOARD
100378	LED, RED	103982	PCB ASSY, 80188 MOTHER BOARD
100381	DIODE, 1N4148	103982	PCB ASSY, 80188 MOTHER BOARD
100404	IC, 74LS245	103982	PCB ASSY, 80188 MOTHER BOARD
100405	IC, 74LS273	103982	PCB ASSY, 80188 MOTHER BOARD
100439	SOCKET, IC, 20 PIN DIP, .1 X .3	103982	PCB ASSY, 80188 MOTHER BOARD
101353	CAP, ELEC, ALUM, 10,000UF, 25V (SNA	103982	PCB ASSY, 80188 MOTHER BOARD
101356	RES ARRAY, 4.7K OHM, SIP PU, 10 PIN	103982	PCB ASSY, 80188 MOTHER BOARD
101357	RES ARRAY, 270 OHM, SIP PU, 10 PIN,	103982	PCB ASSY, 80188 MOTHER BOARD
101360	CONN, HDR, 3 PIN, 1 X 3, .1 SP, GO	103982	PCB ASSY, 80188 MOTHER BOARD
101376	TAPE, FOAM DOUBLE COAT, .5 IN	103982	PCB ASSY, 80188 MOTHER BOARD
102064	RES ARRAY, 1K OHM, SIP PU, 10 PIN,	103982	PCB ASSY, 80188 MOTHER BOARD
102441	CAP, TANT, 10UF, 15V, .1SP	103982	PCB ASSY, 80188 MOTHER BOARD
102445	IC, NVRAM CTLR, DS1210 CMOS, (BAT	103982	PCB ASSY, 80188 MOTHER BOARD
102450	CAP, CERAMIC, MONO, 22PF, 50V, .1 L	103982	PCB ASSY, 80188 MOTHER BOARD
102465	TRANSISTOR, MPSA06, 80V, 500MA, TO-	103982	PCB ASSY, 80188 MOTHER BOARD
102796	HOLDER, BATTERY, .91DIA, .12THK	103982	PCB ASSY, 80188 MOTHER BOARD
102797	CAP, ELEC, TANT, 10UF, 25V, .1 LEAD	103982	PCB ASSY, 80188 MOTHER BOARD
102798	CAP, CERAMIC, MONO, .47UF, 50V, .2	103982	PCB ASSY, 80188 MOTHER BOARD
102799	DIODE, ZENER, 1N5228B, 3.9V	103982	PCB ASSY, 80188 MOTHER BOARD
102800	CONN, HDR, 5 PIN, 1 X 5, .156 SP, W	103982	PCB ASSY, 80188 MOTHER BOARD
102801	CONN, HDR, 8 PIN, 1 X 8, .156 SP,	103982	PCB ASSY, 80188 MOTHER BOARD
102804	CONN, HDR, 34 PIN, 2 X 17	103982	PCB ASSY, 80188 MOTHER BOARD
102805	CONN, HDR, 64 PIN, 2 X 32	103982	PCB ASSY, 80188 MOTHER BOARD
102807	TRANSISTOR, IRF540 FET TO-220	103982	PCB ASSY, 80188 MOTHER BOARD
102808	RES, 1.0 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102809	RES, 365 OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102810	RES, 360 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102811	RES, 1.1 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102812	RES, 12.7K OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102813	RES, 4.7 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102814	RES, 360K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102816	RES, 270K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102817	SOCKET, IC, 68 PIN, PLCC, WO/WIRE B	103982	PCB ASSY, 80188 MOTHER BOARD

102818	IC, 74ALS08	103982	PCB ASSY, 80188 MOTHER BOARD
102821	IC, O.C. DRIVER, ULN2064	103982	PCB ASSY, 80188 MOTHER BOARD
102822	IC, RS232 INTER, 145406	103982	PCB ASSY, 80188 MOTHER BOARD
102823	IC, D/A CONV, DAC0808	103982	PCB ASSY, 80188 MOTHER BOARD
102824	IC, 4-CHAN, A/D CONV, ADC0844	103982	PCB ASSY, 80188 MOTHER BOARD
102825	TEST POINT, TURRET-SWAGE, .094 HOLE	103982	PCB ASSY, 80188 MOTHER BOARD
102829	IC, DUAL H-BRIDGE SW, UDN2993B	103982	PCB ASSY, 80188 MOTHER BOARD
102830	IC, PAL, PROG 16L8, SERVOPEN	103982	PCB ASSY, 80188 MOTHER BOARD
102831	IC, OP W/COMP, LM392	103982	PCB ASSY, 80188 MOTHER BOARD
102837	CAP, CERAMIC, MONO, .01UF, 50V, .2	103982	PCB ASSY, 80188 MOTHER BOARD
102883	HEAT SINK, TO-220, 1.55 X .375, PC	103982	PCB ASSY, 80188 MOTHER BOARD
102988	RES, 2.2 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103039	IC, MICROPROCESSOR, 80188-12, PLCC	103982	PCB ASSY, 80188 MOTHER BOARD
103040	CRYSTAL, 24.576 MHZ	103982	PCB ASSY, 80188 MOTHER BOARD
103042	IC, RAM, STATIC, 32KX8, 62256LP, 12	103982	PCB ASSY, 80188 MOTHER BOARD
103083	FERRITE BEAD, 0-40 MHZ, .21 OD X .4	103982	PCB ASSY, 80188 MOTHER BOARD
103154	CAP, CERAMIC, MONO, 220PF, 25V, .2	103982	PCB ASSY, 80188 MOTHER BOARD
103155	INDUCTOR, 8.2MH, RES.FREQ. 40 MHZ,	103982	PCB ASSY, 80188 MOTHER BOARD
103158	CONN, HDR, 5 PIN, 1 X 5, .100 SP, W	103982	PCB ASSY, 80188 MOTHER BOARD
103261	IC, SN754410-NE, DRIVER, QUADRUPLE	103982	PCB ASSY, 80188 MOTHER BOARD
103293	IC, HEX INVERTER, 74ACT04	103982	PCB ASSY, 80188 MOTHER BOARD
103397	SOCKET, IC, 32 PIN DIP, .1 X .6 MAC	103982	PCB ASSY, 80188 MOTHER BOARD
103418	DIODE, ZENER, 1N5230B, 4.7V	103982	PCB ASSY, 80188 MOTHER BOARD
103724	RES, 4.7 OHM, 5%, 1W	103982	PCB ASSY, 80188 MOTHER BOARD
103725	RES, 680 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103928	RES, 33 OHM, 5%, 1/2W	103982	PCB ASSY, 80188 MOTHER BOARD
103938	ZIPLOCK BAG, STATIC, 12 X 16	103982	PCB ASSY, 80188 MOTHER BOARD
103941	IC, 74ALS573	103982	PCB ASSY, 80188 MOTHER BOARD
103946	RES, 47 OHM, 5%, 1/2W	103982	PCB ASSY, 80188 MOTHER BOARD
103995	RES, 1K OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103996	DIODE, 1N5818	103982	PCB ASSY, 80188 MOTHER BOARD
103997	RES, 2K OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103998	FET, VN10LM	103982	PCB ASSY, 80188 MOTHER BOARD
103999	DIODE, 1N5247	103982	PCB ASSY, 80188 MOTHER BOARD
104020	CAP,DISC/MONO,100PF,5% NPO/COG,50V,	103982	PCB ASSY, 80188 MOTHER BOARD
104594	RES, 1.0 OHM, 5%, 1/2 W	103982	PCB ASSY, 80188 MOTHER BOARD
103503	PCB, 80188-FCC MOTHER BOARD	103982	PCB ASSY, 80188 MOTHER BOARD
102878	INSULATOR, FOR TO220, .600 SP	103982	PCB ASSY, 80188 MOTHER BOARD
102963	HEAT SINK, FOR TO220, .600 SP	103982	PCB ASSY, 80188 MOTHER BOARD
101374	WIRE 20 GA SOLID TINNED, UL 1007/1	103982	PCB ASSY, 80188 MOTHER BOARD
103868	TUBE, TEFLON, CLEAR, 24 GA	103982	PCB ASSY, 80188 MOTHER BOARD
104560	SCREW #4-40, .250 PHP, SEMS	103982	PCB ASSY, 80188 MOTHER BOARD
100120	WSHR, SHLDER, #4 X .031, NYLON	103982	PCB ASSY, 80188 MOTHER BOARD
104337	SCREW #4-40, .375 PHP, SEMS	103982	PCB ASSY, 80188 MOTHER BOARD
101871	WSHR, #4, FLAT, STEEL	103982	PCB ASSY, 80188 MOTHER BOARD
101601	NUT, #4-40, HEX, THIN NYLOCK	103982	PCB ASSY, 80188 MOTHER BOARD
103153	WSHR, .120ID, .180OD, .032TH, FLAT,	103982	PCB ASSY, 80188 MOTHER BOARD

REV	ZONE	DESCRIPTION	REV DATE
3		2238 2258 2379	7-21-92
4	B4	2389 REMOVED JP1, JP2	8-31-92
5	B5 C4	2403 ADDED J7 2403 ADDED C21, R34	8-31-92
5		R/C CLAIRIFIED DETAIL D	8-31-92
6		2656 SCREW ITEM 3 WAS 100012, SCREW ITEM 7 WAS 100014	5-4-93
7		2758 REMOVE 102808 QTY 1, ADD 104594	8-30-93



NOTES:

1. PART MARK BOARD WITH PART NUMBER AND REV LEVEL, PART NUMBER AND REV LEVEL TO REFLECT THIS DRAWING.
2. ADD SERIAL NO. IN LOCATION SHOWN USING PERMANENT BLACK INK.

   AA BBBB CC DD EEE
   - AA — VENDOR'S INITIALS
   - BBBB — PURCHASE ORDER NO.
   - CC — YEAR OF ASSY
   - DD — WEEK OF YEAR OF ASSY
   - EEE — INDIVIDUAL BOARD NUMBER
3. INSTALL X1 AND Q27 ON BOARD WITH DOUBLE BACKED FOAM TAPE.
4. TRIM PIN (KEY) FLUSH WITH BASE OF CONNECTOR.
5. SHUNT JUMPER TO BE ON PINS 1 AND 2.
6. ORIENT D23, D24, AND D25 AS SHOWN ON THIS DRAWING, NOT AS SILKSCREENED ON PCB.
7. CAPACITOR MUST LAY FLAT ON BOARD.
10. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG.
11. KEEP RESISTOR LEADS SHORT, BUT DO NOT STRESS RESISTORS BY BENDING THEM TOO HARD.
12. INSULATE COMPONENT LEADS WITH TUBING, ITEM 16.
13. PLACE COMPONENTS EXACTLY AS SHOWN. COMPONENTS MUST NOT REST ON CLIPPED (SHARP) LEAD ENDS. COMPONENTS MUST NOT OBSCURE PADS; AN AUTOMATED PROBING SYSTEM WILL BE USED THAT REQUIRES ACCESS TO THESE PADS.
14. DO NOT INSTALL RESISTORS IN LOCATIONS R43-R50, INSTALL CAPACITORS C62-C69 INSTEAD.

-	-	-	-	7	5	7	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

IOLINE CORPORATION

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DRFT	CS	2-18-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103982S1	

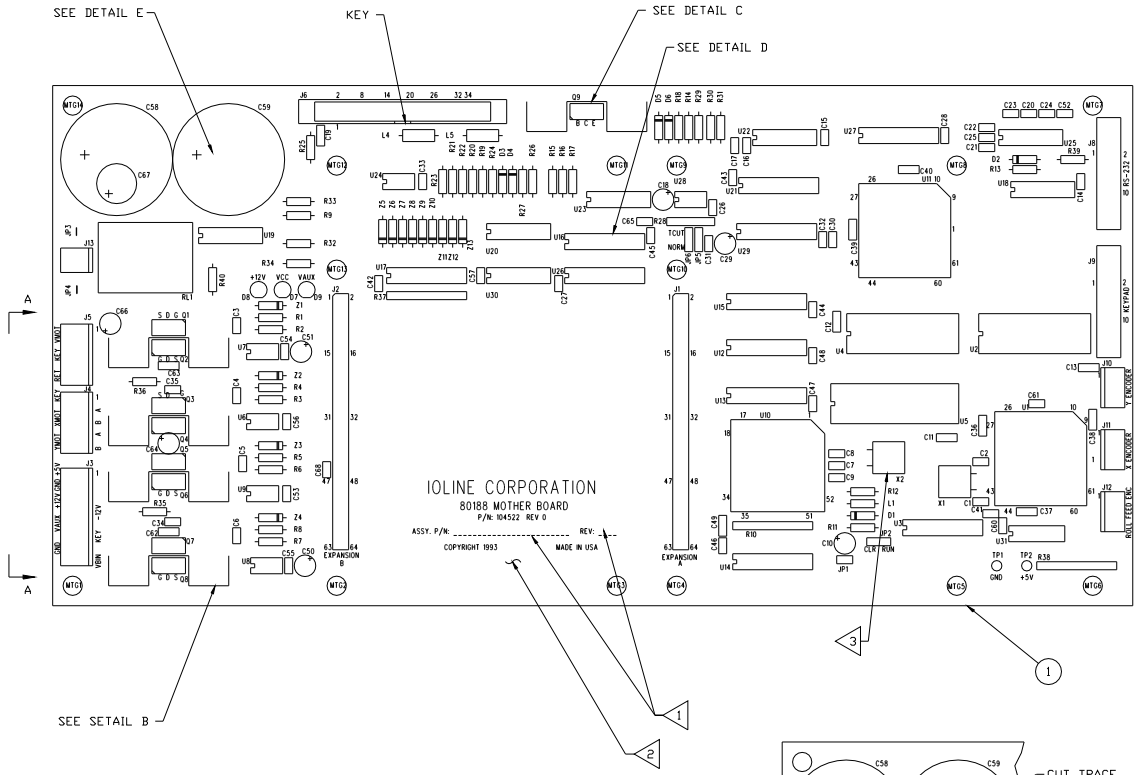
DRAWING NAME: PCB ASSY, 80188 MOTHER BOARD

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: X = ± .1
.XX = ± .03
ANGLE = ± 3° .XXX = ± .010
DO NOT SCALE DRAWING

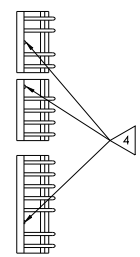
REV	Sheet No.	Drawing/Part No.
7	1 OF 3	103982

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
100336	RES, 1K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100342	RES, 220 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100343	RES, 2.2K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100344	RES, 270 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100349	RES, 4.7K OHM, 5%, 1/4 W	104523	PCB ASSY, 80188 LOGIC BOARD
100350	RES, 510 OHM, 5%, 1/4 W	104523	PCB ASSY, 80188 LOGIC BOARD
100353	RES ARRAY, 3.3K OHM, SIP PU, 6 PIN,	104523	PCB ASSY, 80188 LOGIC BOARD
100361	CAP, CERAMIC, MONO, 100PF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
100364	CAP, CERAMIC, MONO, 47PF, 50V, .1 L	104523	PCB ASSY, 80188 LOGIC BOARD
100371	TRANSISTOR, TIP 115 (CAN SUB 117)	104523	PCB ASSY, 80188 LOGIC BOARD
100378	LED, RED	104523	PCB ASSY, 80188 LOGIC BOARD
100381	DIODE, 1N4148	104523	PCB ASSY, 80188 LOGIC BOARD
100404	IC, 74LS245	104523	PCB ASSY, 80188 LOGIC BOARD
100405	IC, 74LS273	104523	PCB ASSY, 80188 LOGIC BOARD
100436	SOCKET, IC, 8 PIN DIP, .1 X .3	104523	PCB ASSY, 80188 LOGIC BOARD
100438	SOCKET, IC, 16 PIN DIP, .1 X .3	104523	PCB ASSY, 80188 LOGIC BOARD
100439	SOCKET, IC, 20 PIN DIP, .1 X .3	104523	PCB ASSY, 80188 LOGIC BOARD
100917	IC, 74LS157	104523	PCB ASSY, 80188 LOGIC BOARD
101356	RES ARRAY, 4.7K OHM, SIP PU, 10 PIN	104523	PCB ASSY, 80188 LOGIC BOARD
101360	CONN, HDR, 3 PIN, 1 X 3, .1 SP, GO	104523	PCB ASSY, 80188 LOGIC BOARD
101374	WIRE 20 GA SOLID TINNED, UL 1007/1	104523	PCB ASSY, 80188 LOGIC BOARD
102064	RES ARRAY, 1K OHM, SIP PU, 10 PIN,	104523	PCB ASSY, 80188 LOGIC BOARD
102450	CAP, CERAMIC, MONO, 22PF, 50V, .1 L	104523	PCB ASSY, 80188 LOGIC BOARD
102797	CAP, ELEC, TANT, 10UF, 25V, .1 LEAD	104523	PCB ASSY, 80188 LOGIC BOARD
102798	CAP, CERAMIC, MONO, .47UF, 50V, .2	104523	PCB ASSY, 80188 LOGIC BOARD
102800	CONN, HDR, 5 PIN, 1 X 5, .156 SP, W	104523	PCB ASSY, 80188 LOGIC BOARD
102801	CONN, HDR, 8 PIN, 1 X 8, .156 SP,	104523	PCB ASSY, 80188 LOGIC BOARD
102805	CONN, HDR, 64 PIN, 2 X 32	104523	PCB ASSY, 80188 LOGIC BOARD
102806	CONN, HDR, 2 PIN, 1 X 2, .1 SP	104523	PCB ASSY, 80188 LOGIC BOARD
102808	RES, 1.0 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102809	RES, 365 OHM, 1%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102810	RES, 360 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102811	RES, 1.1 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102812	RES, 12.7K OHM, 1%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102813	RES, 4.7 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102814	RES, 360K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102816	RES, 270K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102817	SOCKET, IC, 68 PIN, PLCC, WO/WIRE B	104523	PCB ASSY, 80188 LOGIC BOARD
102821	IC, O.C. DRIVER, ULN2064	104523	PCB ASSY, 80188 LOGIC BOARD
102822	IC, RS232 INTER, 145406	104523	PCB ASSY, 80188 LOGIC BOARD
102823	IC, D/A CONV, DAC0808	104523	PCB ASSY, 80188 LOGIC BOARD
102824	IC, 4-CHAN, A/D CONV, ADC0844	104523	PCB ASSY, 80188 LOGIC BOARD
102825	TEST POINT, TURRET-SWAGE, .094 HOLE	104523	PCB ASSY, 80188 LOGIC BOARD
102829	IC, DUAL H-BRIDGE SW, UDN2993B	104523	PCB ASSY, 80188 LOGIC BOARD
102830	IC, PAL, PROG 16L8, SERVOPEN	104523	PCB ASSY, 80188 LOGIC BOARD
102831	IC, OP W/COMP, LM392	104523	PCB ASSY, 80188 LOGIC BOARD
102988	RES, 2.2 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
103039	IC, MICROPROCESSOR, 80188-12, PLCC	104523	PCB ASSY, 80188 LOGIC BOARD

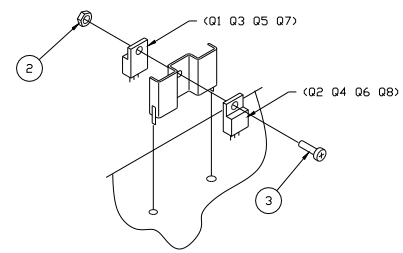
103040	CRYSTAL, 24.576 MHZ	104523	PCB ASSY, 80188 LOGIC BOARD
103042	IC, RAM, STATIC, 32KX8, 62256LP, 12	104523	PCB ASSY, 80188 LOGIC BOARD
103083	FERRITE BEAD, 0-40 MHZ, .21 OD X .4	104523	PCB ASSY, 80188 LOGIC BOARD
103155	INDUCTOR, 8.2MH, RES.FREQ. 40 MHZ,	104523	PCB ASSY, 80188 LOGIC BOARD
103158	CONN, HDR, 5 PIN, 1 X 5, .100 SP, W	104523	PCB ASSY, 80188 LOGIC BOARD
103261	IC, SN754410-NE, DRIVER, QUADRUPLE	104523	PCB ASSY, 80188 LOGIC BOARD
103397	SOCKET, IC, 32 PIN DIP, .1 X .6 MAC	104523	PCB ASSY, 80188 LOGIC BOARD
103418	DIODE, ZENER, 1N5230B, 4.7V	104523	PCB ASSY, 80188 LOGIC BOARD
103725	RES, 680 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
103798	IC, ROM, EE, X24C16, XICOR	104523	PCB ASSY, 80188 LOGIC BOARD
103941	IC, 74ALS573	104523	PCB ASSY, 80188 LOGIC BOARD
104318	CONN, HDR, 2 PIN, .156 SP, W/LOCK	104523	PCB ASSY, 80188 LOGIC BOARD
104528	CONN, HDR, 2 X 5 MALE, W/LATCHES	104523	PCB ASSY, 80188 LOGIC BOARD
104531	CAP, CERAMIC, MONO, .022UF, 50V, .	104523	PCB ASSY, 80188 LOGIC BOARD
104532	CAP, CERAMIC, MONO, .1UF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
104533	CAP, CERAMIC, MONO, .01UF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
104534	CAP, CERAMIC, MONO, 220PF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
104535	CAP, CERAMIC, MONO, .33UF, 50V, .2	104523	PCB ASSY, 80188 LOGIC BOARD
104536	IC, MICROPROCESSR, ADSP-2105	104523	PCB ASSY, 80188 LOGIC BOARD
104537	IC, 74HC32, QUAD OR, CMOS	104523	PCB ASSY, 80188 LOGIC BOARD
104538	RES, 47 OHM, 5%, 1/4 W	104523	PCB ASSY, 80188 LOGIC BOARD
104539	TRANSISTOR, P MOSFET	104523	PCB ASSY, 80188 LOGIC BOARD
104540	IC, TC4426, DUAL MOSFET DRIVER	104523	PCB ASSY, 80188 LOGIC BOARD
104541	CRYSTAL, 10.000 MHZ, HC49	104523	PCB ASSY, 80188 LOGIC BOARD
104542	DIODE, ZENER, IN5237B, 8.2V	104523	PCB ASSY, 80188 LOGIC BOARD
102807	TRANSISTOR, IRF540 FET TO-220	104523	PCB ASSY, 80188 LOGIC BOARD
104545	SOCKET, IC, 28 PIN, MACH PIN	104523	PCB ASSY, 80188 LOGIC BOARD
100365	CAP, ELEC, ALUM, 470UF, 25V, RADIAL	104523	PCB ASSY, 80188 LOGIC BOARD
103938	ZIPLOCK BAG, STATIC, 12 X 16	104523	PCB ASSY, 80188 LOGIC BOARD
104581	CONN, HDR, 2 X 17 PIN, W/EJECT	104523	PCB ASSY, 80188 LOGIC BOARD
104594	RES, 1.0 OHM, 5%, 1/2 W	104523	PCB ASSY, 80188 LOGIC BOARD
104885	HEATSINK, MACHINED	104523	PCB ASSY, 80188 LOGIC BOARD
104614	HEAT SINK, TO-220	104523	PCB ASSY, 80188 LOGIC BOARD
101353	CAP, ELEC, ALUM, 10,000UF, 25V (SNA	104523	PCB ASSY, 80188 LOGIC BOARD
105858	TRANSISTOR, MTP23P06V, PMOSFET	104523	PCB ASSY, 80188 LOGIC BOARD
104522	PCB, 80188 MOTHER BOARD	104523	PCB ASSY, 80188 LOGIC BOARD
101601	NUT, #4-40, HEX, THIN NYLOCK	104523	PCB ASSY, 80188 LOGIC BOARD
104337	SCREW #4-40, .375 PHP, SEMS	104523	PCB ASSY, 80188 LOGIC BOARD
101397	WIRE 18 GA ST BLK, 6 IN, UL 1007	104523	PCB ASSY, 80188 LOGIC BOARD



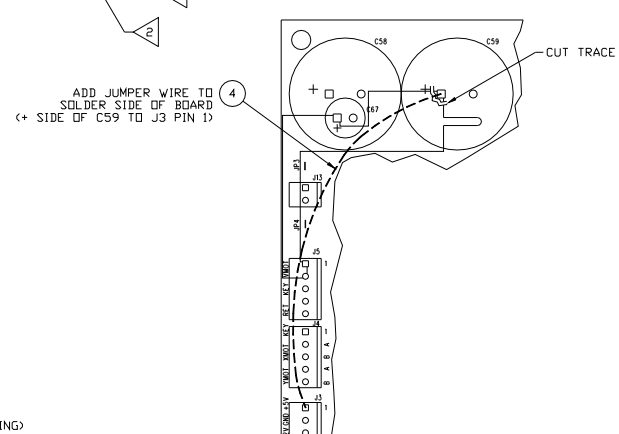
REV	ZONE	DESCRIPTION	REV DATE
1		2728	9-1-93
2		2758 CHG R25, WAS 102828 IS 104594	9-1-93
3		2762 ADD U3 104526	9-1-93
4	B2	2783 ADD NOTE 6	9-1-93
5		2790 REMOVED 104530 (U11) AND 104526 (U3)	9-14-93
6		2793 HEATSINK WAS 102883 IS 104614, RAMOVE RELAY 104582	10-13-93
7	B2	2807 ADD NOTE 7	10-13-93
8		2870 REMOVE 104256 GAL 16V8-15	3-11-94
9		2878 REMOVE 104614 HEATSINK, ADD 104885	3-11-94
10		3187 ADD 104535 CAP.	2-28-95
11		3239 104614 HEATSINK WAS 104885 HEATSINK	2-28-95
12	B3 A3	3286 ADD 101353 CAP, ADD DETAIL E AND JUMPER	4-20-95
13		3552 ADD 101397 WIRE	5-8-96
14		3661 104532 WAS 104531 (C3,4,5,6), 102808 WAS 104538 (R1,4,5,8); 105858 WAS 104539 (Q1,3,5,7)	9-17-96



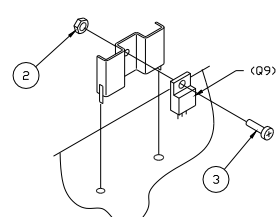
VIEW A-A



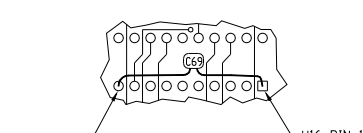
DETAIL B
4X



DETAIL E



DETAIL C



DETAIL D
SOLDER SIDE

NOTES:

1. PART MARK BOARD WITH PART NUMBER AND REV LEVEL, PART NUMBER AND REV LEVEL TO REFLECT THIS DRAWING.
2. ADD SERIAL NO. IN LOCATION SHOWN USING PERMANENT BLACK INK.

   AA BBBB CC DD EEE
   - EEE: INDIVIDUAL BOARD NUMBER
   - DD: WEEK OF YEAR OF ASSY
   - CC: YEAR OF ASSY
   - BBBB: PURCHASE ORDER NO.
   - AA: VENDOR'S INITIALS

3. INSTALL X1 AND X2 ON BOARD WITH DOUBLE BACKED FOAM TAPE.
4. TRIM PIN (KEY) FLUSH WITH BASE OF CONNECTOR.
5. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG.
6. MAX LEAD LENGTH FROM SOLDER SIDE OF BOARD (AFTER SOLDERING) .06" MAX.
7. COMPONENT HEIGHT (FROM COMPONENT SIDE OF BOARD) 1.22 MAX.

-	-	-	-	-	14	14	REV	REV STATUS OF SHEETS
7	6	5	4	3	2	1	SHEET	

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DRFT	CS	5-26-93
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LB	File Name: 104523	

DRAWING NAME: PCB ASSY, 80188 LOGIC BOARD

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±, .XX = ±, ANGLE = ± °, .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
14	1 OF 2	104523

RUN

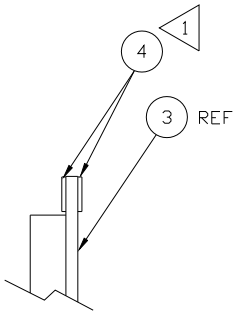
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

U10 80C188-12
U1 ADSP-2105
U2 27C512
U3 74LS573
U4 74LS573
U5 27C040
U4 62256-120
U15 74LS245
U16 74LS273
U21 74LS273
U22 DAC08C
U18 74LS157
U19 ULN2064
U20 ULN2064
U11 100A
U12 74LS573
U13 74LS573
U7 74LS573
U31 74HC32
U23 UDN2993B
U24-B LM392
U24-A LM392
U9 TC4426
U8 TC4426
U7 TC4426
U6 TC4426
U30 SN754410
U25 MC145406
U26 74LS273
U27 16L8
U28 X24C16
U29 ADC0844
MAIN POWER CONNECTOR
JP1 HDR 1X2
JP2 HEADER 1x2
JP3 JMPR WIRE
JP4 JMPR WIRE
JP5 HEADER 1x3
JP6 HEADER 1x3
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)

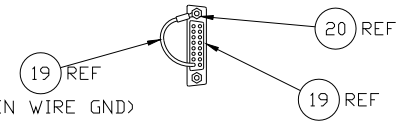
COMPANY: IOLINE			
TITLE: PCB ASSY, 8018B MOTHER BOARD			
DRAWN: CS	DATED: 5-26-93		
CHECKED:	DATED:	CODE:	SIZE: DRAWING NO: 104523 REV: 14
QUALITY CONTROL:	DATED:		
RELEASED:	DATED:	SCALE:	SHEET:2 OF2

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	102396	COVER ASSY, RIGHT TOP
103841	COVER, RIGHT TOP, 5000	102396	COVER ASSY, RIGHT TOP
102404	BEZEL, DISPLAY	102396	COVER ASSY, RIGHT TOP
103455	TAPE, DOUBLE BACKED, .010 THK X .25	102396	COVER ASSY, RIGHT TOP
102635	WINDOW, KEYPAD	102396	COVER ASSY, RIGHT TOP
102634	KEYPAD ASSY	102396	COVER ASSY, RIGHT TOP
102369	BRACKET, REAR PANEL,5000	102396	COVER ASSY, RIGHT TOP
100300	FUSE, 2A, 250V, 3AG S.B.	102396	COVER ASSY, RIGHT TOP
100305	POWER ENTRY MODULE, W/FUSEHOLDER	102396	COVER ASSY, RIGHT TOP
100247	CONN, TERMINAL, RING, #8, 22-16 GA	102396	COVER ASSY, RIGHT TOP
100191	WIRE 18 GA ST GRN X 10 IN UL 1007	102396	COVER ASSY, RIGHT TOP
100749	CABLE ASSY, REAR PANEL TO LOGIC PC	102396	COVER ASSY, RIGHT TOP
100121	JACK SOCKET KIT, #4-40	102396	COVER ASSY, RIGHT TOP
100830	COVER, RECEPTACLE	102396	COVER ASSY, RIGHT TOP
103840	BRACKET, TOP	102396	COVER ASSY, RIGHT TOP
100081	NUT, #6-32, HEX	102396	COVER ASSY, RIGHT TOP
100083	WSHR, #6, FLAT, NYLON	102396	COVER ASSY, RIGHT TOP
100080	WSHR, #6, LOCK, EXT STAR	102396	COVER ASSY, RIGHT TOP
100063	SCREW #4-40, .375 LG, PHP, BLK OXI	102396	COVER ASSY, RIGHT TOP
100074	WSHR, #4, LOCK, INT STAR	102396	COVER ASSY, RIGHT TOP
100075	NUT, #4-40, HEX, ZINC PLATED	102396	COVER ASSY, RIGHT TOP
102406	SPACER, #6 X .50 NYLON	102396	COVER ASSY, RIGHT TOP

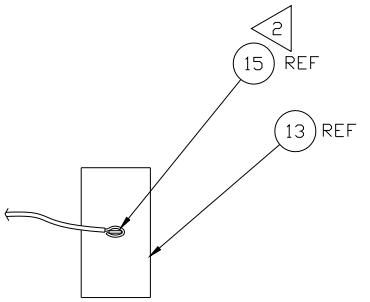
REV	ZONE	DESCRIPTION	REV DATE
5		956 1212 1321 1376	12-19-90
6		1888	7-23-91
7	D5	2449 ADDED DETAIL C	10-6-92
8	A3	2491 ADDED NOTE 3	12-8-92



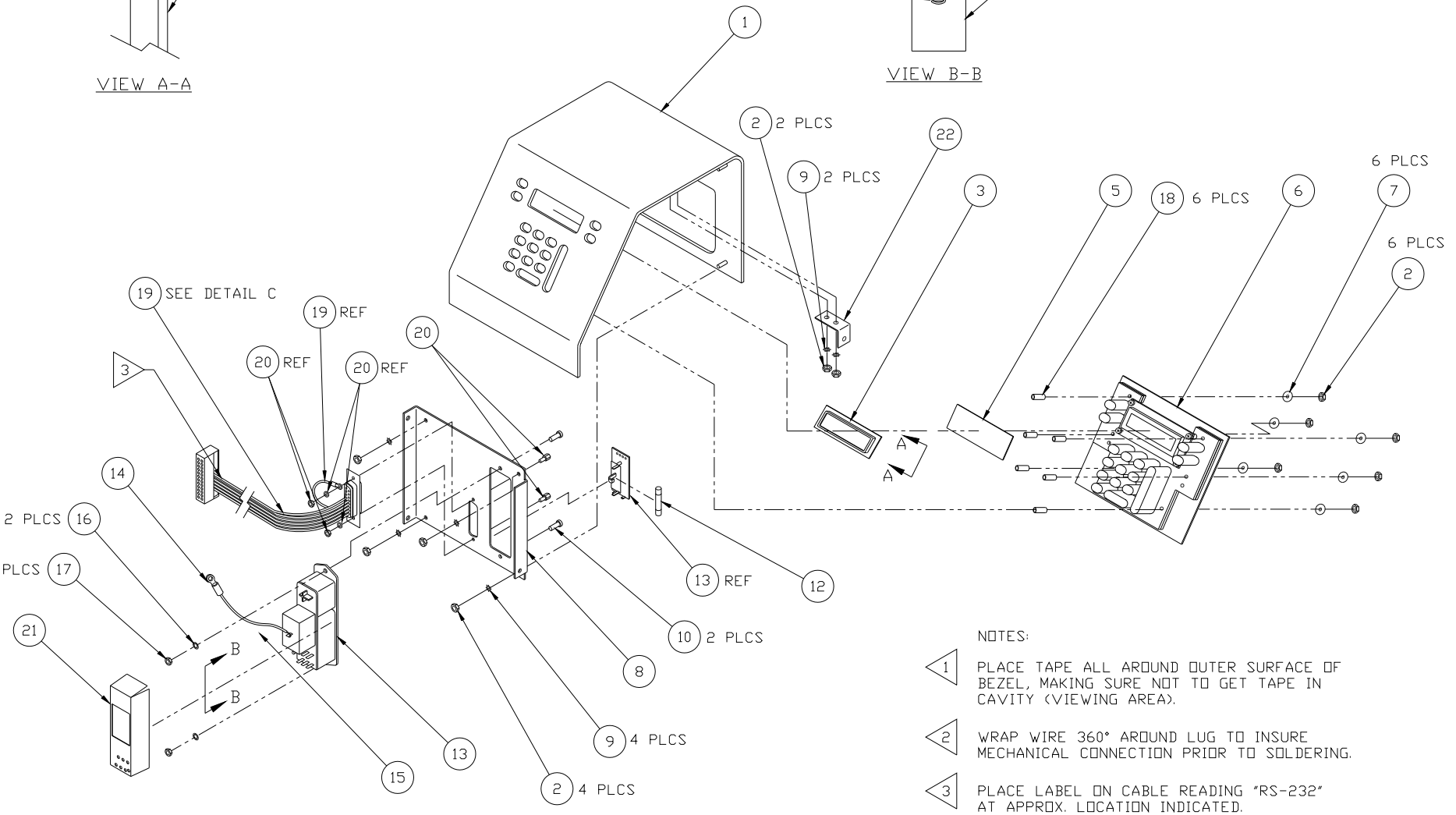
VIEW A-A



DETAIL C



VIEW B-B



NOTES:

1. PLACE TAPE ALL AROUND OUTER SURFACE OF BEZEL, MAKING SURE NOT TO GET TAPE IN CAVITY (VIEWING AREA).
2. WRAP WIRE 360° AROUND LUG TO INSURE MECHANICAL CONNECTION PRIOR TO SOLDERING.
3. PLACE LABEL ON CABLE READING "RS-232" AT APPROX. LOCATION INDICATED.

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DRFT	CS	1-5-90
CHK		
ENGR		
MATL		
MFG		
QA		
MTKG		
File Name:	102396	

DRAWING NAME: COVER ASSY, RIGHT TOP

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 1° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
8	1 OF 1	102396

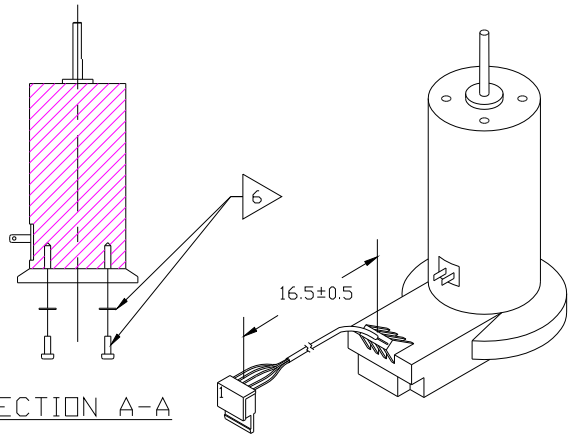
REV	ZONE	DESCRIPTION	REV DATE
2		1454 2354	6-23-92
3	B3 A3	2648: ø.1556 WAS ø.1563 ø.1563 WAS ø.1566	4-26-93
4	B4 A4	2771 ADDED SECTION A-A, ADDED NOTE 6	8-17-93

CONNECTOR
AMP #640443-5

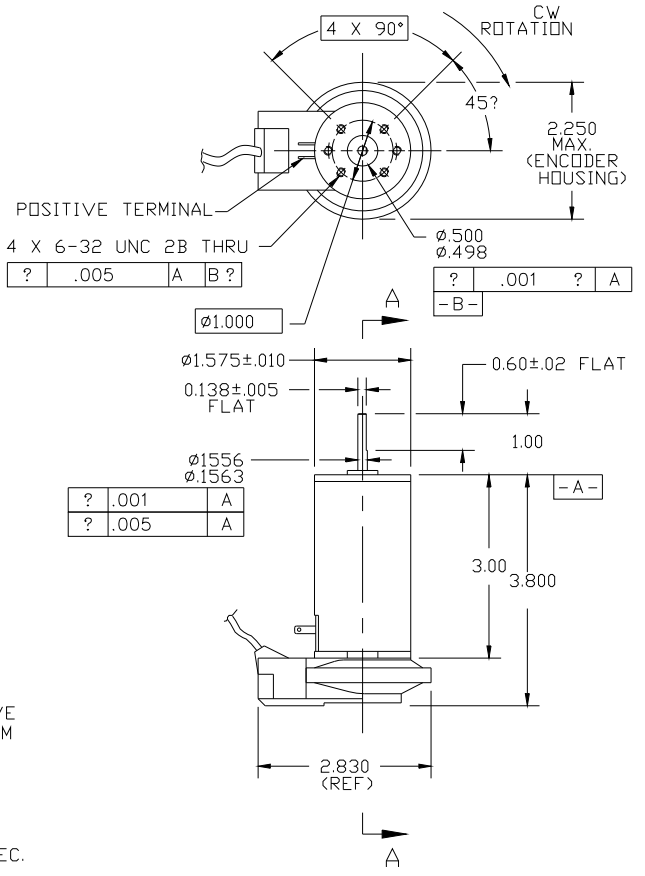
ENCODER MODULE
HP HEDS-9000-B

1	BLK	GND
2	SHIELD	N.C. (THIS END ONLY)
3	WHT	CHANNEL A
4	RED	VCC
5	GRN	CHANNEL B

WIRING DIAGRAM



SECTION A-A



NOTES:

1. SHAFT ROTATION TO BE CLOCKWISE WITH POSITIVE VOLTAGE APPLIED TO "+" TERMINAL (VIEWED FROM MOTOR MOUNTING END).
2. SHAFT END PLAY TO BE .015 MAX. WITH 5 LBS. FORCE APPLIED IN DIRECTION SHOWN.
3. MOTOR MUST WITHSTAND 500 VAC HI-POT FOR 1 SEC. WITH LESS THAN 10 MA FAULT CURRENT.
4. SHAFT MUST RETURN TO WITHIN .0005 OF ITS ORIGINAL POSITION AFTER END PLAY TEST.
5. MOTOR TERMINALS TO MATE WITH AMP 110 SERIES FASTON CONNECTORS (.020 THK. TAB) OR EQUIVALENT.
6. ENCODER HOUSING SCREWS MUST BE LOCKED IN PLACE USING SMALL FASTENER LOCTITE. FASTENERS HOLDING ENCODER HOUSING TO MOTOR MUST HAVE FLAT WASHERS AND THEY ARE TO BE TIGHTENED TO 3 INCH-POUNDS (SEE SECTION A-A).

MOTOR PERFORMANCE DATA			
PARAMETERS	SYMBOL	UNIT	VALUE
RATED VOLTAGE	V	VOLTS	13.5
STALL CURRENT	Is	AMPS	15.4
BACK EMF CONSTANT	Ke	V/KRPM	2.13
TORQUE CONSTANT	Kt	IN.OZ/A	2.88
NO LOAD SPEED	Wnl	RPM	6195
NO LOAD CURRENT	Inl	AMPS	.35
FRICTION TORQUE (STATIC)	Tf	IN. OZ.	1
STALL TORQUE	Ts	IN. OZ.	43
TERMINAL RESISTANCE	Rt	OHMS	.88
TERMINAL INDUCTANCE	L	MH	.95
AMMATURE INERT	J	MOISS	
THERMAL IMPEDANCE	Rth	C°/WAT	
THERMAL TIME CONSTANT	Tth	MIN.	
MAX. WINDING TEMP.		C°	
MOTOR WEIGHT		OZ.	

ENCODER SPECIFICATION	
DESCRIPTION	PART NO.
HEWLETT PACKARD ENCODER	
MODULE	HEDS-9000-B (1000CT)
HEWLETT PACKARD ENCODER	
DISK, OR EQUIVALENT	HEDS-6100-B (1000CT)
HANSEN MFG. ENCODER	
HOUSING	1000CT-TYPE

WIRE SPECIFICATION	
DESCRIPTION	PART NO.
CABLE, SHIELDED, 4 COND.,	
24 GA.	BELDEN P/N 9534

CONNECTOR SPECIFICATION	
DESCRIPTION	PART NO.
AMP CONNECTOR	640443-5
AMP CONNECTOR COVER	643075-5

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DRFT	JF	9-21-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103450	

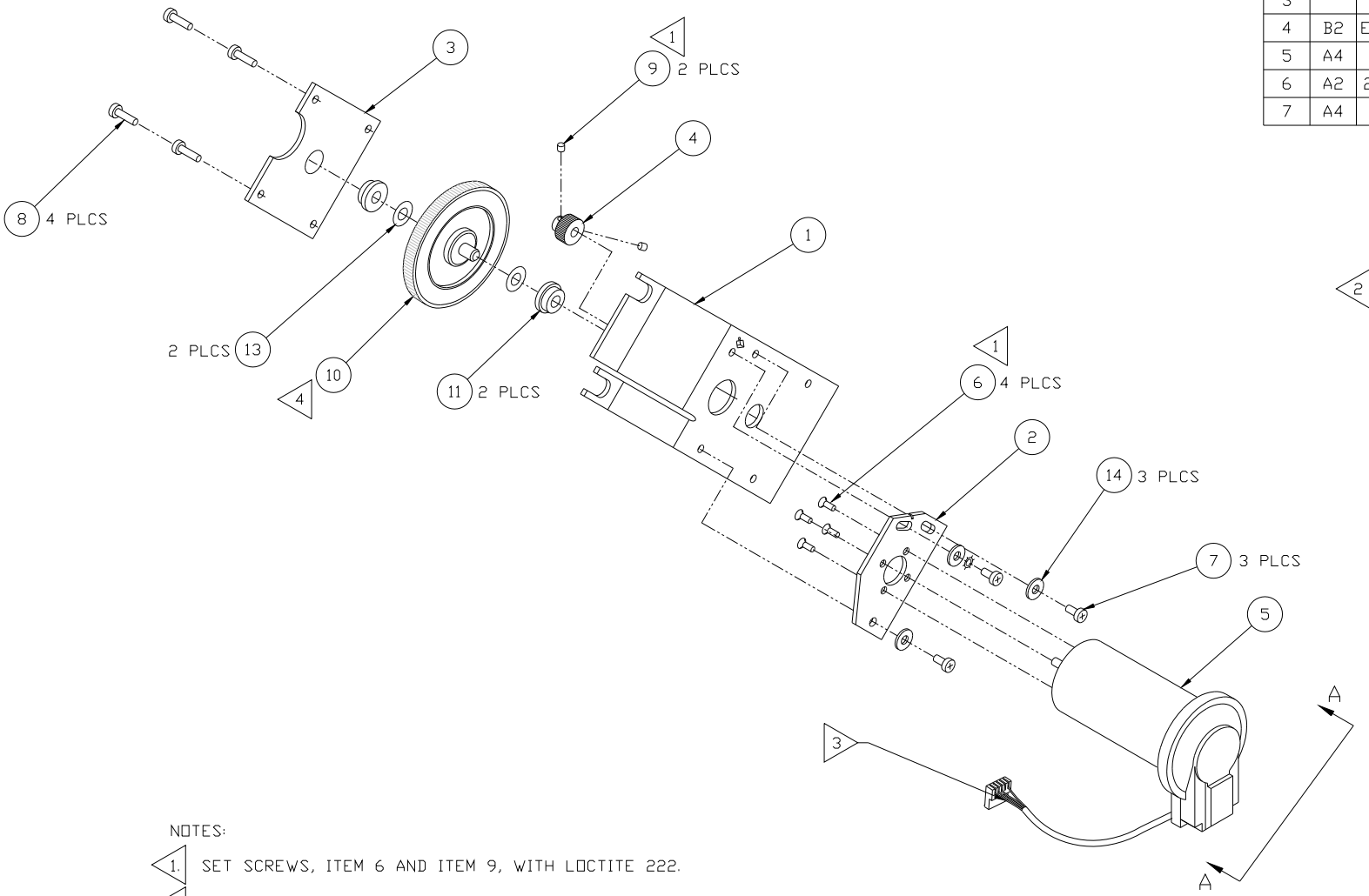
DRAWING NAME:
MOTOR, SERVO, 1000CT ENCODER,SIGNATURE 5000

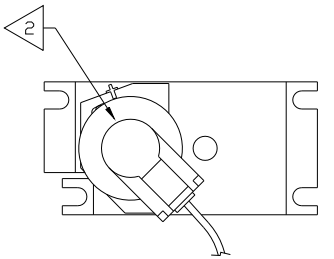
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .01
ANGLE = ± 1° .XXX = ± .005
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
4	1 OF 1	103450

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103494	TRANS ASSY, X-DRIVE, 1000 CT
102902	BRACKET, TRANSMISSION, X-DRIVE	103494	TRANS ASSY, X-DRIVE, 1000 CT
102903	PLATE, MTG, MOTOR	103494	TRANS ASSY, X-DRIVE, 1000 CT
102904	PLATE, SUB, TRANSMISSION, X-DRIVE	103494	TRANS ASSY, X-DRIVE, 1000 CT
102910	GEAR, 33 TOOTH, 64 PITCH, 20 DEG	103494	TRANS ASSY, X-DRIVE, 1000 CT
103450	MOTOR, SERVO, 1000 CT ENCODER	103494	TRANS ASSY, X-DRIVE, 1000 CT
102939	GEAR ASSY, X-DRIVE, 165 TOOTH, 64	103494	TRANS ASSY, X-DRIVE, 1000 CT
102655	BEARING, FLANGE, .250ID, .500OD	103494	TRANS ASSY, X-DRIVE, 1000 CT
102737	SCREW #6-32, .25 LG, FHP	103494	TRANS ASSY, X-DRIVE, 1000 CT
104008	SCREW #8-32, .375 LG, PHP SEMS	103494	TRANS ASSY, X-DRIVE, 1000 CT
103908	SCREW #8-32, .50 LG, PHP SEMS	103494	TRANS ASSY, X-DRIVE, 1000 CT
102944	SCREW, #6-32 X .125 LG SH SET, CUP	103494	TRANS ASSY, X-DRIVE, 1000 CT
103551	WSHR, WAVE, .265 ID, .367 OD	103494	TRANS ASSY, X-DRIVE, 1000 CT
100091	WSHR, #8, FLAT, STEEL	103494	TRANS ASSY, X-DRIVE, 1000 CT

REV	ZONE	DESCRIPTION	REV DATE
3		ECO 1480 1504 2054	11-8-91
4	B2	ECO 2429: ADDED ITEM 14	9-14-92
5	A4	2491 ADDED NOTE 3	12-8-92
6	A2	2595 ITEM 7 WAS 100033	3-3-93
7	A4	3011: ADDED NOTE 4	7-7-94





VIEW A-A

NOTES:

1. SET SCREWS, ITEM 6 AND ITEM 9, WITH LOCTITE 222.
2. ORIENT ENCODER AS SHOWN.
3. PLACE LABEL ON CABLE READING "X ENCODER" AT APPROX. LOCATION INDICATED.
4. SET GEAR COMPRESSION PER ASSEMBLY PROCESS NOTES.

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DRFT	CS	4-11-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103494	

DRAWING NAME: TRANSMISSION ASSY, X-DRIVE, 1000 CT

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± ° .XXX = ±
DO NOT SCALE DRAWING

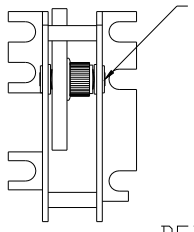
REV	Sheet No.	Drawing/Part No.
7	1 OF 1	103494

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102908	PLATE, MTG, MOTOR, Y-DRIVE	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102910	GEAR, 33 TOOTH, 64 PITCH, 20 DEG	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103450	MOTOR, SERVO, 1000 CT ENCODER	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103527	GEAR ASSY, Y-DRIVE, 165 TOOTH, 64 P	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103212	SHAFT, Y-AXIS DRIVE	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102344	PULLEY, IDLER	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102650	BEARING .375 X .125	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103528	BRACKET, TRANSMISSION, LOWER, Y-DR	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103529	BRACKET, TRANSMISSION, UPPER, Y-DR	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102655	BEARING, FLANGE, .250ID, .500OD	103523	TRANS ASSY, Y-DRIVE, 1000 CT
100044	SCREW #8-32, .75 PHP	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102737	SCREW #6-32, .25 LG, FHP	103523	TRANS ASSY, Y-DRIVE, 1000 CT
104008	SCREW #8-32, .375 LG, PHP SEMS	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102944	SCREW, #6-32 X .125 LG SH SET, CUP	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102322	RING, RETAINING, E-CLIP, .125	103523	TRANS ASSY, Y-DRIVE, 1000 CT
100087	WSHR, #8, LOCK, EXT	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103401	SPACER, #6, .312 LG, NYLON	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103970	SPACER, PRECISION, 1/8"	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103551	WSHR, WAVE, .265 ID, .367 OD	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103973	WSHR, .170 ID, .375 OD, .035TH, SS	103523	TRANS ASSY, Y-DRIVE, 1000 CT

REV	ZONE	DESCRIPTION	REV DATE
2		ECO 1504 2159	3-6-92
3	A5	ECO 2428: ADDED ITEM 20.	9-22-92
4	A3	2491 ADDED NOTE 3	12-8-92
5	B8 C8	2521 ADDED DETAIL A ADDED NOTES 4 AND 5	2-2-93
6	A5	2595 ITEM 6 WAS 100033	3-3-93
7	A5	2616 ITEM 20 WAS 100091	3-23-93
8	C8	2884: ADDED NOTE 6, REVISED NOTE 5	4-8-94
9	C8	3011: ADDED NOTE 7	7-7-94

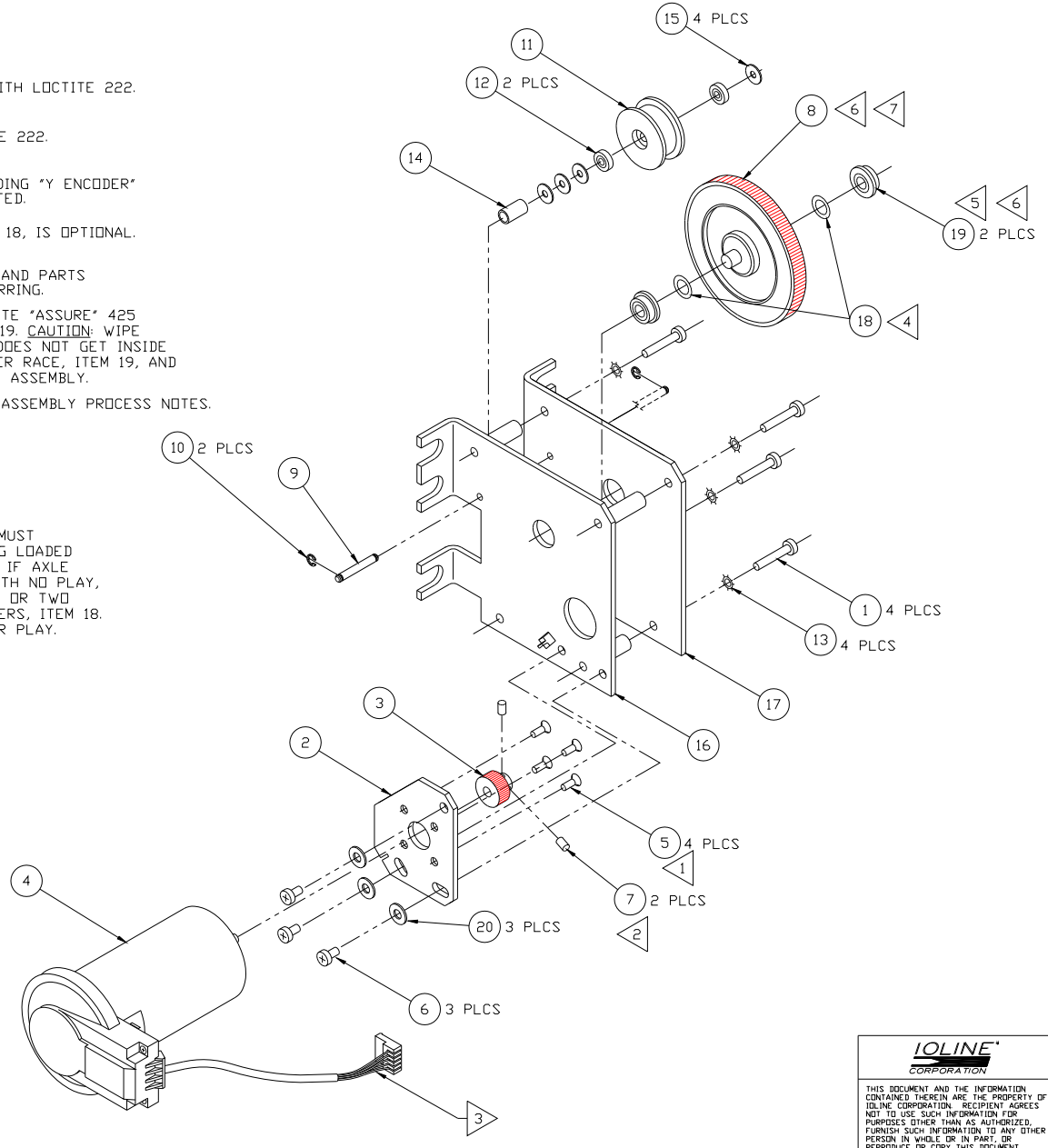
NOTES:

1. SECURE ITEM 5 TO ITEM 4 WITH LOCTITE 222.
2. SECURE ITEM 7 WITH LOCTITE 222.
3. PLACE LABEL ON CABLE READING "Y ENCODER" AT APPROX. LOCATION INDICATED.
4. SECOND WAVE WASHER, ITEM 18, IS OPTIONAL. SEE DETAIL A
5. DEBURRING IS NOT ALLOWED AND PARTS SHOULD ASSEMBLE W/O DEBURRING.
6. ADD SMALL AMOUNT OF LOCTITE "ASSURE" 425 TO BEARING INNER I.D., ITEM 19. CAUTION: WIPE OFF EXCESS LOCTITE SO IT DOES NOT GET INSIDE BEARING. CLEAN BEARING INNER RACE, ITEM 19, AND GEAR PINS, ITEM 8, PRIOR TO ASSEMBLY.
7. SET GEAR COMPRESSION PER ASSEMBLY PROCESS NOTES.



STUB AXLE MUST HAVE SPRING LOADED AXIAL PLAY. IF AXLE IS SOLID WITH NO PLAY, REMOVE ONE OR TWO WAVE WASHERS, ITEM 18. RECHECK FOR PLAY.

DETAIL A



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DRFT	JF	11-13-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103523	

DRAWING NAME: TRANSMISSION ASSY, Y-DRIVE, 1000 CT

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± .XXX = ±
DO NOT SCALE DRAWING

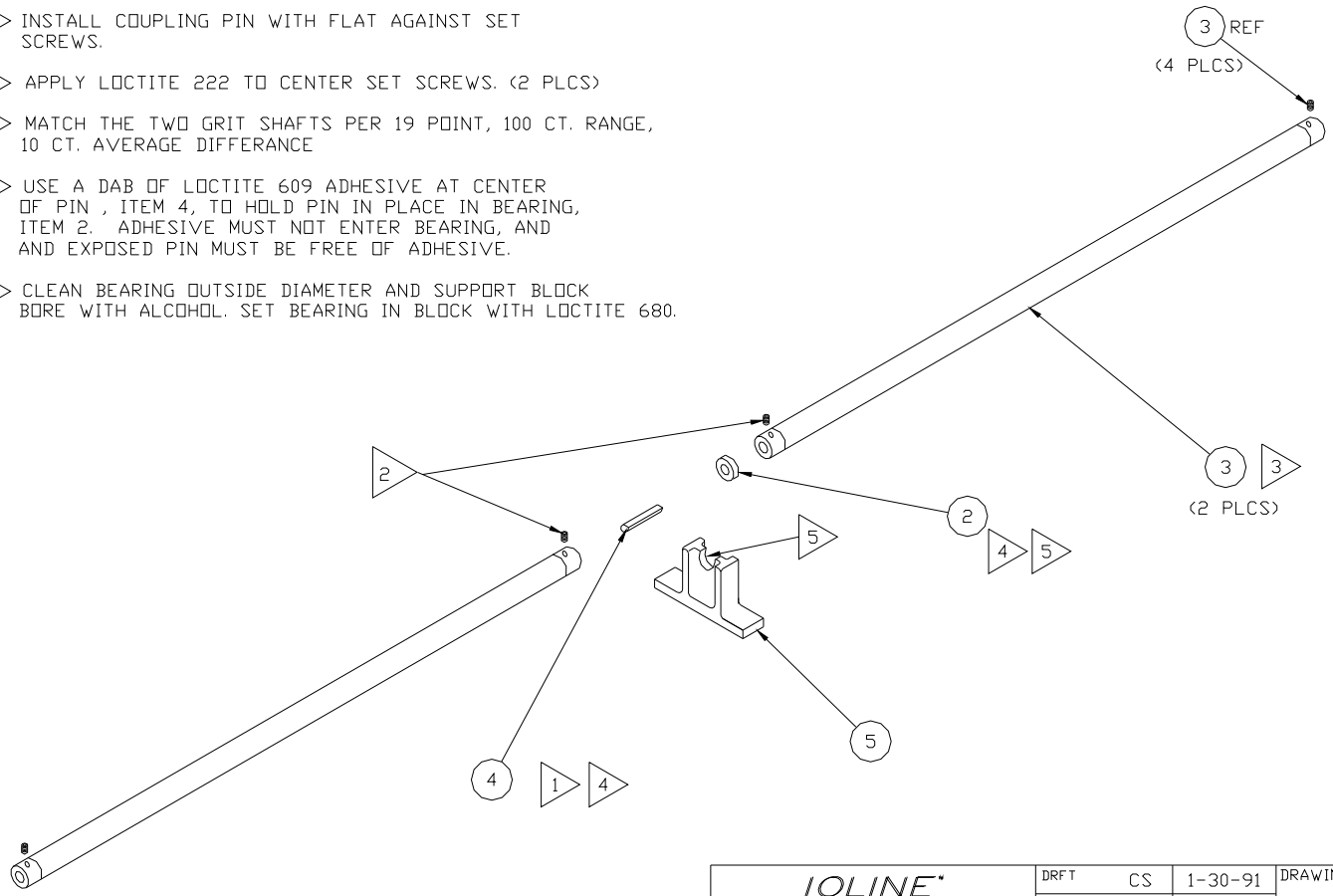
REV	Sheet No.	Drawing/Part No.
9	1 OF 1	103523

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-03	LABOR, MACHINE SHOP	102419	GRIT SHAFT ASSY, X AXIS DRIVE
101051-04	LABOR, GRITSHAFT	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100316	BEARING, BALL, .25ID, .625OD, .196	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100550	SHAFT, X-AXIS DRIVE FINISHED	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100551	PIN, .249 DIA, 1.20 LG	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100552	SUPPORT BLOCK, X-AXIS	102419	GRIT SHAFT ASSY, X AXIS DRIVE

REV	ZONE	DESCRIPTION	REV DATE
5		1511 2251	4-3-92
6	B4	2488 CHG NOTES 3 & 5	12-3-92

NOTES:

1. INSTALL COUPLING PIN WITH FLAT AGAINST SET SCREWS.
2. APPLY LOCTITE 222 TO CENTER SET SCREWS. (2 PLCS)
3. MATCH THE TWO GRIT SHAFTS PER 19 POINT, 100 CT. RANGE, 10 CT. AVERAGE DIFFERANCE
4. USE A DAB OF LOCTITE 609 ADHESIVE AT CENTER OF PIN , ITEM 4, TO HOLD PIN IN PLACE IN BEARING, ITEM 2. ADHESIVE MUST NOT ENTER BEARING, AND AND EXPOSED PIN MUST BE FREE OF ADHESIVE.
5. CLEAN BEARING OUTSIDE DIAMETER AND SUPPORT BLOCK BORE WITH ALCOHOL. SET BEARING IN BLOCK WITH LOCTITE 680.



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DRFT	CS	1-30-91
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	102419	

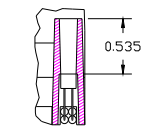
DRAWING NAME: GRIT SHAFT ASSY, X AXIS DRIVE

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 1° .XXX = ± .010
DO NOT SCALE DRAWING

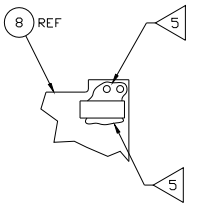
REV	Sheet No.	Drawing/Part No.
6	1 OF 1	102419

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	102393	CARRIAGE ASSY
103828	WHEEL, CARRIAGE	102393	CARRIAGE ASSY
102991	SHAFT, WHEEL	102393	CARRIAGE ASSY
103220	SHAFT, .1255 DIA, 2.30 LG, PLT. ST	102393	CARRIAGE ASSY
103303	PLATE, PEN LIFT ASSY	102393	CARRIAGE ASSY
103300	FRAME, CARRIAGE, MACHINED	102393	CARRIAGE ASSY
102340	GEAR, PEN LIFT	102393	CARRIAGE ASSY
103298	MOUNT, GEAR/MOTOR, MACHINED	102393	CARRIAGE ASSY
104499	PCB ASSY, PEN CARRIAGE	102393	CARRIAGE ASSY
102380	MOTOR, PEN LIFT	102393	CARRIAGE ASSY
102327	SHAFT, PEN LIFT GEAR	102393	CARRIAGE ASSY
105120	CLAMP, RIBBON CABLE	102393	CARRIAGE ASSY
103507	CLAMP, PEN LIFT MOTOR	102393	CARRIAGE ASSY
103221	BEARING, RADIAL FLANGE, .125ID, .3	102393	CARRIAGE ASSY
102614	OPTO ASSY	102393	CARRIAGE ASSY
102632	SPRING, PEN LIFT	102393	CARRIAGE ASSY
102402	BEARING, .125ID X .250OD	102393	CARRIAGE ASSY
102979	SPACER #4, .188OD, .125ID, SS RAF	102393	CARRIAGE ASSY
100705	PAD, PEN CAP, 1/4 DIA	102393	CARRIAGE ASSY
103260	SCREW #4-40, .75 LG, PHP	102393	CARRIAGE ASSY
102620	WAVE WASHER	102393	CARRIAGE ASSY
102322	RING, RETAINING, E-CLIP, .125	102393	CARRIAGE ASSY
102976	SCREW #4-24, .312 LG, PHP, BLUNT PO	102393	CARRIAGE ASSY
102411	SCREW #4-24, .75 LG, FHP, STL PLAT	102393	CARRIAGE ASSY
103481	WSHR, .196ID, .312OD, .062TH, NYLON	102393	CARRIAGE ASSY
103224	SCREW #1-64, .25 LG, PH SLOT	102393	CARRIAGE ASSY
103659	WSHR, .125ID, .020TH, FLAT, NYLON	102393	CARRIAGE ASSY

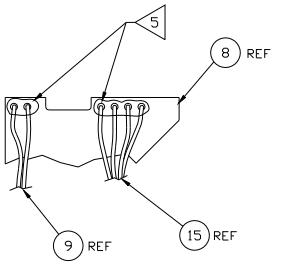
REV	ZONE	DESCRIPTION	REV DATE
1	B3 B4	ADDED ITEMS 22,23,24 ADDED ITEM 25	4-19-90
2	A2	CHANGED ITEM 2	4-23-90
4		ECO 929 1038	6-25-90
7		ECO 1059 1069 1076	8-15-90
10		ECO 1094 1200 1268	11-5-90
11		ECO 1290	11-5-90
12		ECO 1345	11-15-90
14		ECO 1451 1463	1-29-91
15		ECO 1598	4-4-91
16		ECO 1715	5-23-91
18		ECO 1826 1842	7-2-91
20		ECO 1863 1876	7-15-91
21		ECO 2370	7-13-92
23	C6 C6	2600 CHANGED PCB 2608 REMOVED CLAMP	3-17-93
24	C3	3186: ADDED ITEM 11	1-13-95



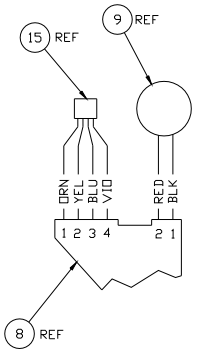
VIEW B-B

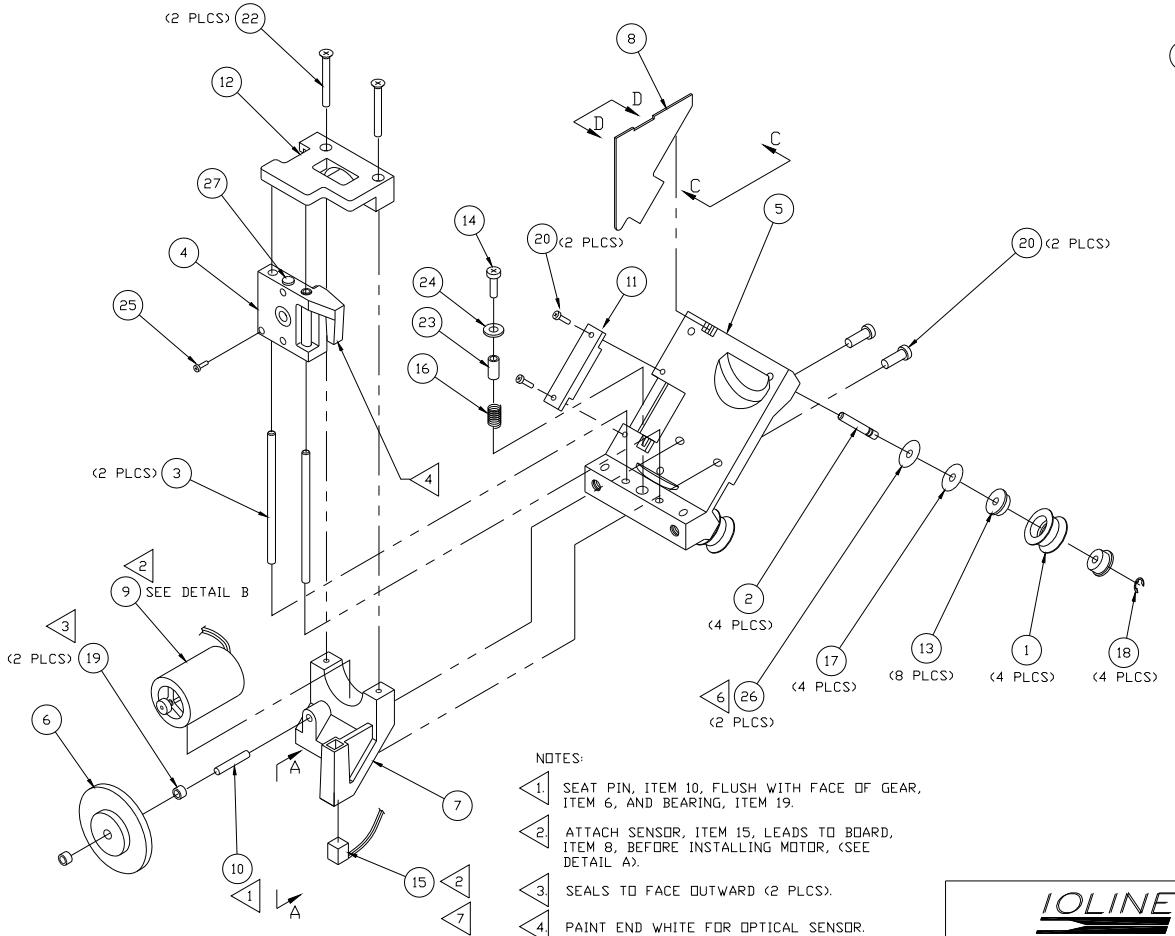


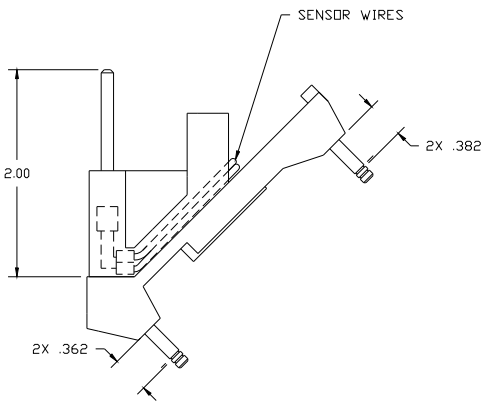
VIEW D-D



VIEW C-C

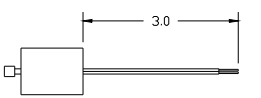






DETAIL A

SCALE: 2X



DETAIL B

NOTES:

1. SEAT PIN, ITEM 10, FLUSH WITH FACE OF GEAR, ITEM 6, AND BEARING, ITEM 19.
2. ATTACH SENSOR, ITEM 15, LEADS TO BOARD, ITEM 8, BEFORE INSTALLING MOTOR, (SEE DETAIL A).
3. SEALS TO FACE OUTWARD (2 PLCS).
4. PAINT END WHITE FOR OPTICAL SENSOR.
5. USE HOT MELT GLUE AS STRAIN RELIEF ON WIRE AND TRIM POT AS SHOWN.
6. INSTALL NYLON WASHER, ITEM 26, TWO PLACES ONLY, ONE ON EACH OF THE UPPER SHAFTS.
7. GLUE SENSOR, ITEM 15, INTO GEAR/MOTOR MOUNT, ITEM 7, WITH LOCTITE 460.

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DRFT	CS	1-26-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LP	File Name: 102393	

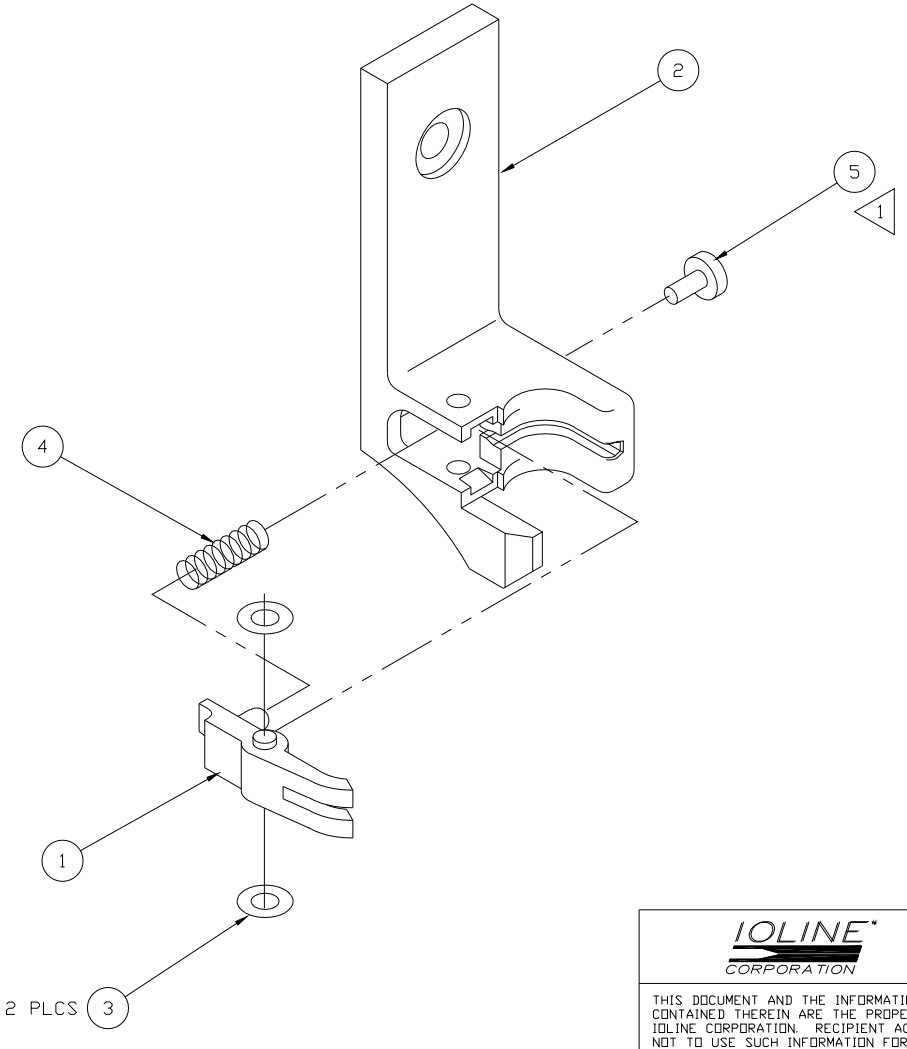
DRAWING NAME: CARRIAGE ASSEMBLY

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 2° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
24	1 OF 1	102393

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	102389	PEN HOLDER ASSY
102350	JAW, MOVING, SINGLE	102389	PEN HOLDER ASSY
102351	JAW, FIXED, SINGLE PEN	102389	PEN HOLDER ASSY
103388	SPRING, COMPRESSION, .240 OD, .032	102389	PEN HOLDER ASSY
103102	POST, ALIGNMENT	102389	PEN HOLDER ASSY
102620	WAVE WASHER	102389	PEN HOLDER ASSY

REV.	ECO:	REV DATE
1	1098	8-10-90
2	1108	8-13-90



NOTES:

1. GLUE IN PLACE WITH LOCTITE 460.

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	By:	Date:
DRFT	CS	8-7-90
CHK		
ENGR		
MATL		
MFG		
QA		
File Name:	102389	

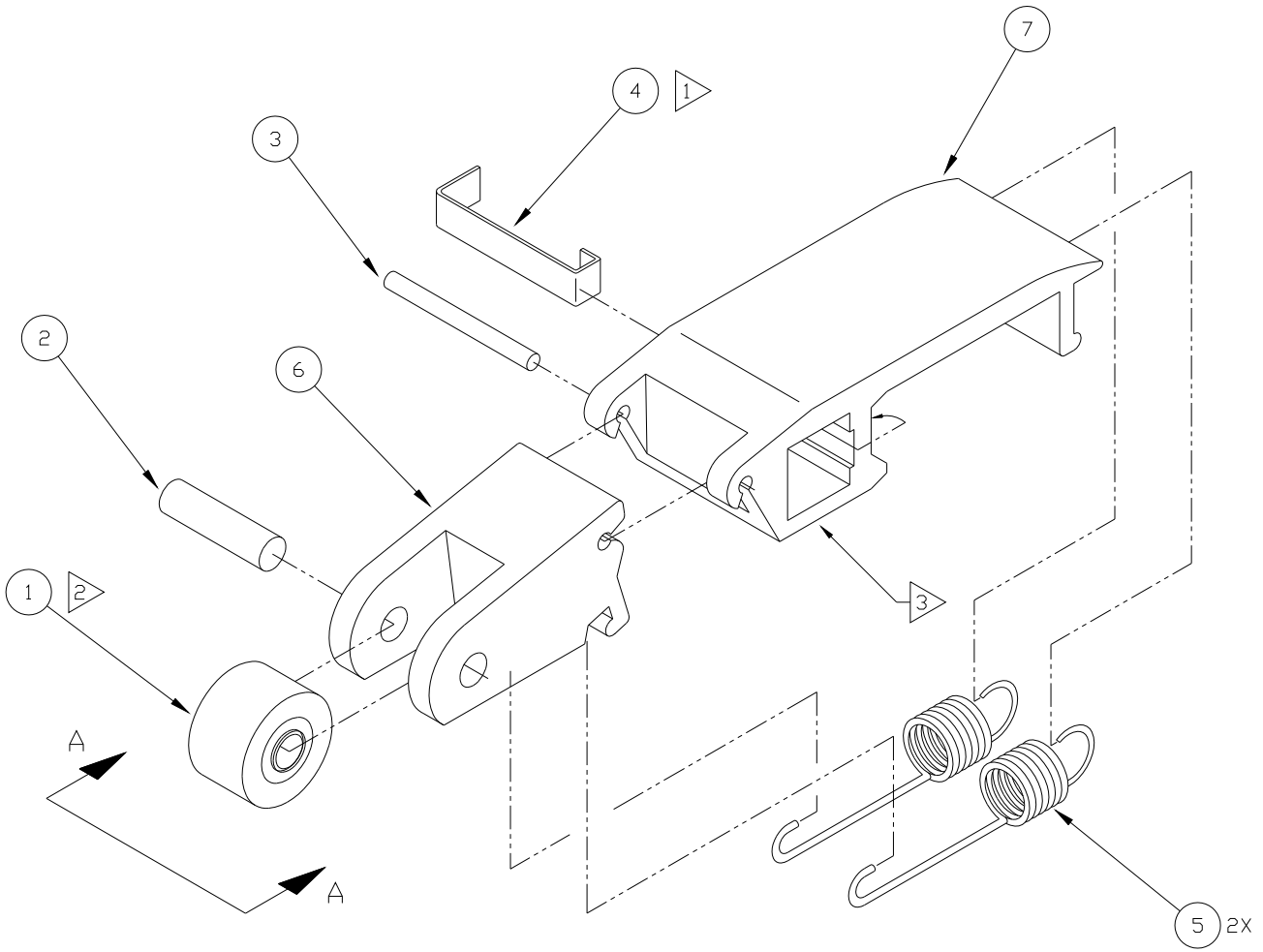
DRAWING NAME:
PEN HOLDER ASSY
–

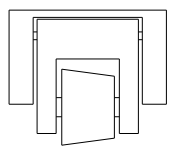
UNLESS OTHERWISE SPECIFIED
Dim: INCHES Tol: .X = ±.1
.XX = ±.01
ANGLE = ±2° .XXX = ±.005
DO NOT SCALE TO DRAWING

REV.	Sheet No.	Dwg./Part No.:
2	1 OF 1	102389

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
100943	WHEEL, IDLER ARM	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101004	AXLE, IDLER ARM WHEEL	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101861	PIN, IDLER ARM	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101862	SPRING, SLIDE, CHART WHEEL	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101863	SPRING, TENSION, CHART WHEEL, 4#	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101866	ARM, IDLER, ALUM EXTRUSION, ANODIZE	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101867	ARM IDLER, LIFTER, ALUM EXTRUSION,	101864	CHART WHEEL ASSY, LEFT, TWO SPRING

REV	ZONE	DESCRIPTION	REV DATE
1	B3	2627 CORRECTED VIEW OF ITEM 4	3-31-93
2	C2	3204: MOVED LABEL, NOTE 3	2-13-95
3	B2	3941 UPDATE IDLER ARM VIEW	8-8-97





VIEW A-A

NOTES:

1. INSERT THRU SQUARE HOLE THEN CRIMP IN PLACE.
2. BEVEL TO LEFT AS IN VIEW A-A.
3. LABEL "L" WITH PERMANENT INDELIBLE FELT TIP MARKER.

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DRFT	BLF	7-18-89
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LP	File Name:	101864

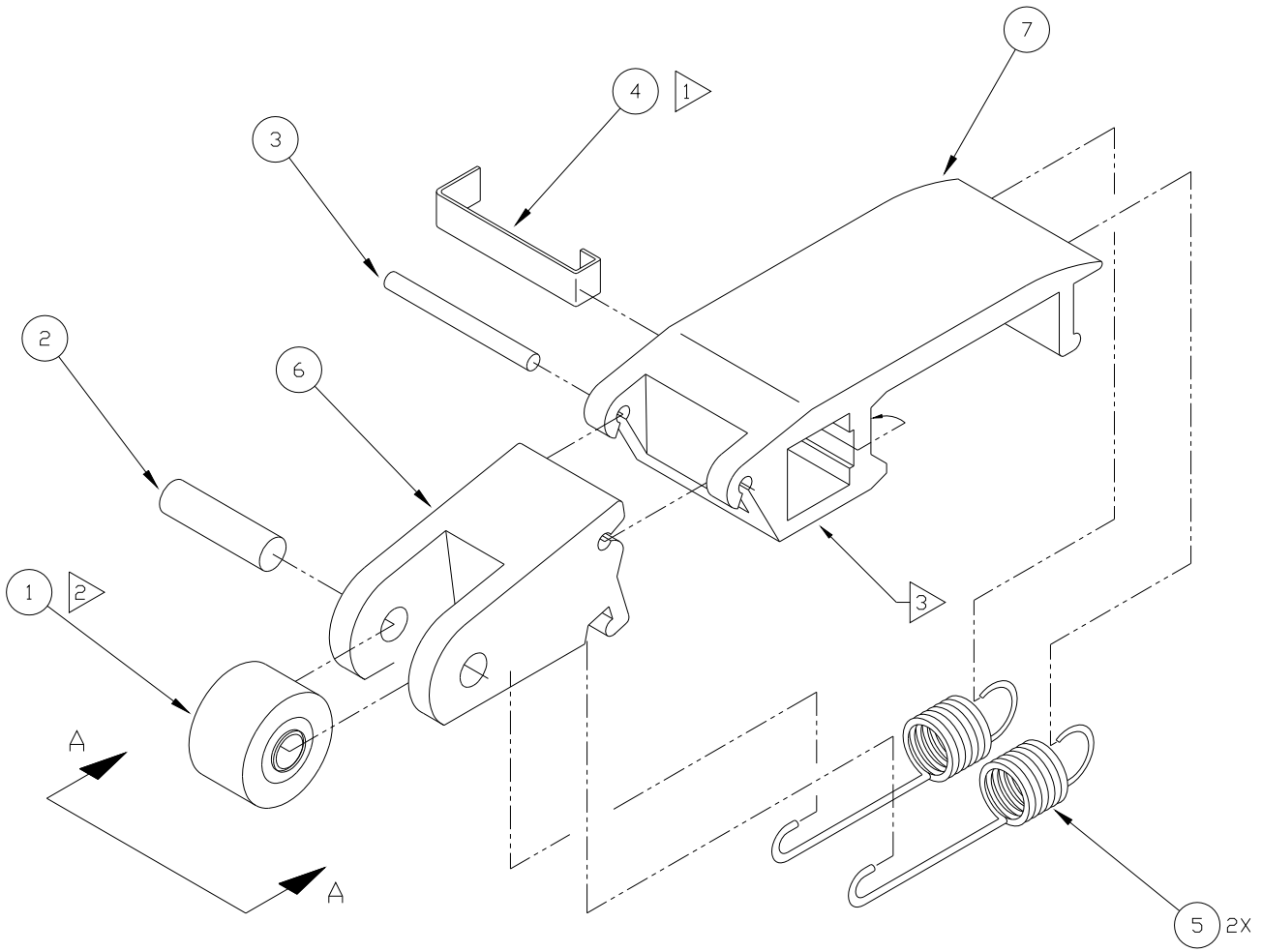
DRAWING NAME:
CHART WHEEL ASSY, LEFT, TWO SPRING

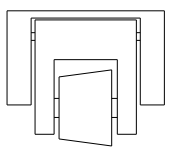
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
ANGLE = ± 2° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
3	1 OF 1	101864

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
100943	WHEEL, IDLER ARM	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101004	AXLE, IDLER ARM WHEEL	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101861	PIN, IDLER ARM	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101862	SPRING, SLIDE, CHART WHEEL	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101863	SPRING, TENSION, CHART WHEEL, 4#	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101866	ARM, IDLER, ALUM EXTRUSION, ANODIZE	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101867	ARM IDLER, LIFTER, ALUM EXTRUSION,	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING

REV	ZONE	DESCRIPTION	REV DATE
1	B3	2627 CORRECTED VIEW OF ITEM 4	3-31-93
2	C2	3204: MOVED LABEL, NOTE 3	2-13-95
3	B2	3941 UPDATE IDLER ARM VIEW	8-8-97





VIEW A-A

NOTES:

1. INSERT THRU SQUARE HOLE THEN CRIMP IN PLACE.
2. BEVEL TO RIGHT AS IN VIEW A-A.
3. LABEL "R" WITH PERMANENT INDELIBLE FELT TIP MARKER.

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DRFT	BLF	7-18-89
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LP	File Name:	101865

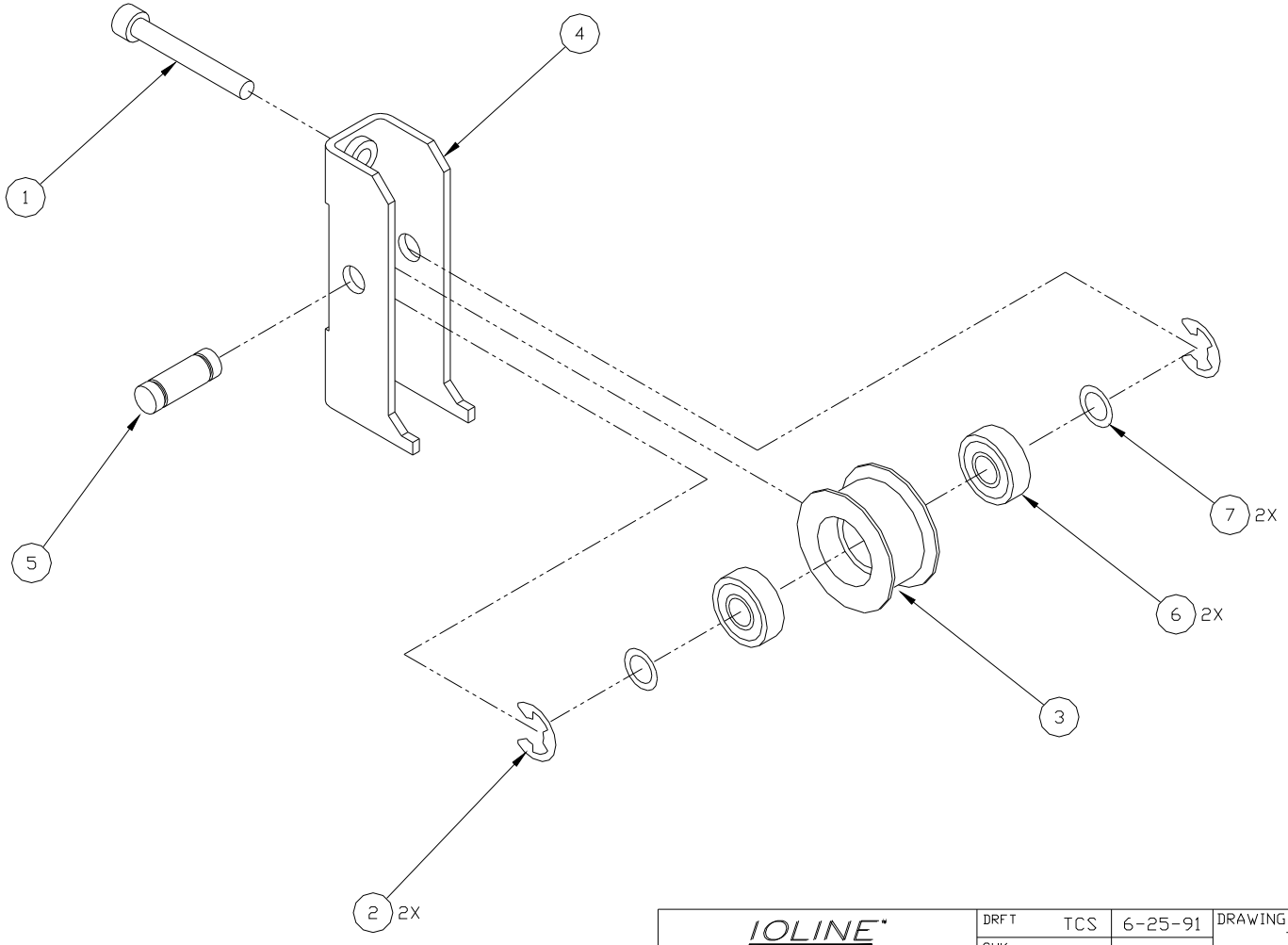
DRAWING NAME: CHART WHEEL ASSY, RIGHT, TWO SPRING

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 2° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
3	1 OF 1	101865

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103826	TENSIONER ASSY
103822	PULLEY, IDLER, .25 DIA. SHAFT	103826	TENSIONER ASSY
103823	TENSIONER, Y-AXIS, .25 DIA. SHAFT	103826	TENSIONER ASSY
103824	SHAFT, IDLER PULLEY, .25 DIA.	103826	TENSIONER ASSY
100316	BEARING, BALL, .25ID, .625OD, .196	103826	TENSIONER ASSY
103825	SPACER, SHAFT	103826	TENSIONER ASSY
100046	SCREW #8-32, 1.25 LG, SHC, FULL THD	103826	TENSIONER ASSY
102222	RING, RETAINING, E-CLIP, 1/4	103826	TENSIONER ASSY

REV	ECO:	REV DATE



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DRFT	TCS	6-25-91
CHK		
ENGR		
MATL		
MFG		
QA		
SERV		
File Name:	103826	

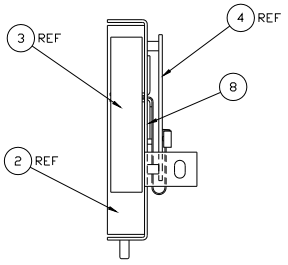
DRAWING NAME:
TENSIONER ASSY

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± ° .XXX = ±
DO NOT SCALE DRAWING

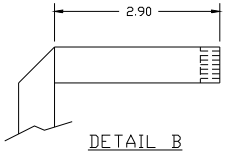
REV	Sheet No.	Drawing/Part No.
0	1 OF 1	103826

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	104481	CARTRIDGE ASSY, METAL
103571	COVER, CARTRIDGE	104481	CARTRIDGE ASSY, METAL
103572	CARTRIDGE, BODY	104481	CARTRIDGE ASSY, METAL
102410	FLEX CABLE, 12 COND	104481	CARTRIDGE ASSY, METAL
102884	PCB ASSY, CARTRIDGE	104481	CARTRIDGE ASSY, METAL
101376	TAPE, FOAM DOUBLE COAT, .5 IN	104481	CARTRIDGE ASSY, METAL
105562	PROTECTOR, PIN, CARTRIDGE	104481	CARTRIDGE ASSY, METAL
104337	SCREW #4-40, .375 PHP, SEMS	104481	CARTRIDGE ASSY, METAL
104007	SCREW #8-32, .312 LG, PHP SEMS	104481	CARTRIDGE ASSY, METAL
104013	NUT, #8-32, KEP	104481	CARTRIDGE ASSY, METAL

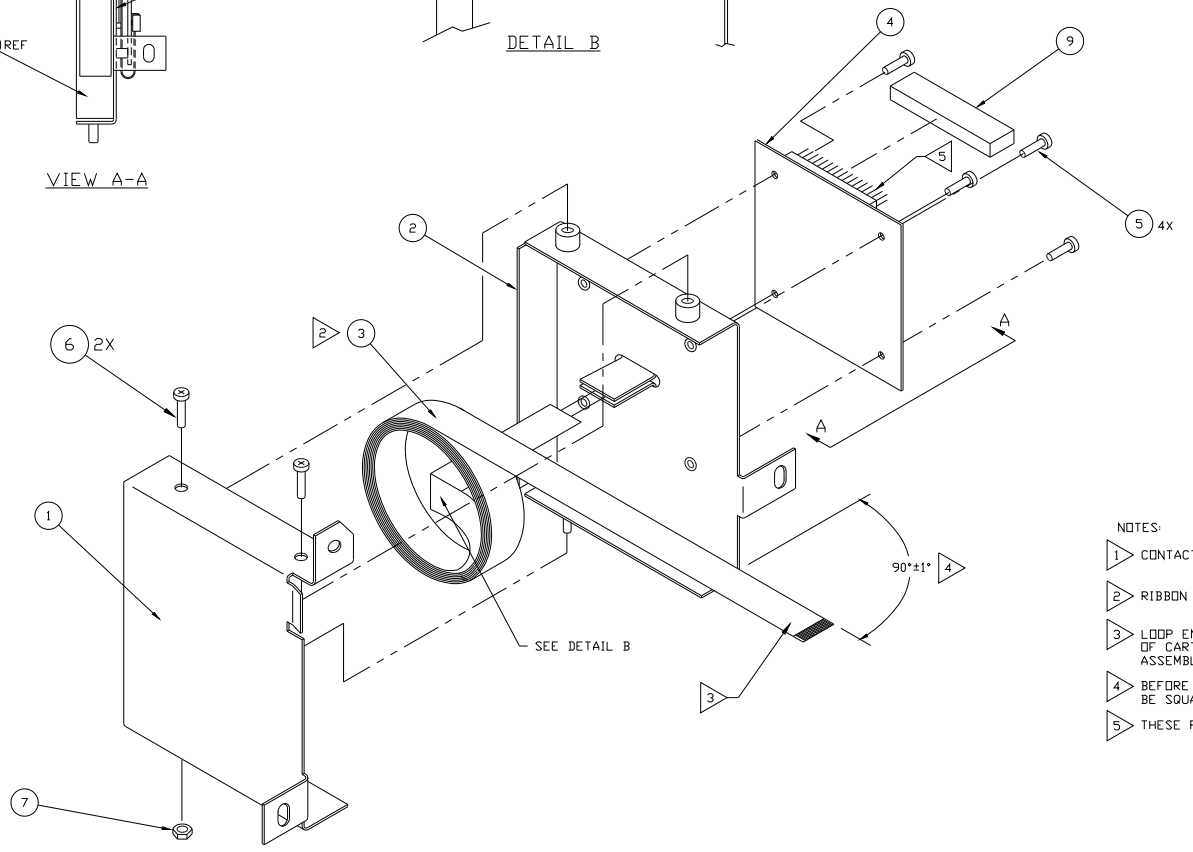
REV	ZONE	DESCRIPTION	REV DATE
1	A2 A2	2686 15 COILS WAS 14 ADDED NOTE 4 & DETAIL	5-18-93
2		3328 ADD NOTE 5, ADD 105562 PIN PROTECTOR	11-14-95



VIEW A-A



DETAIL B



NOTES:

1. CONTACTS MUST FACE DOWN, AS SHOWN IN DETAIL B.
2. RIBBON CABLE MUST HAVE 15 COILS (WRAPS).
3. LOOP END OF CABLE AROUND AND TAPE TO OUTSIDE OF CARTRIDGE SO THAT CABLE WILL NOT RECOIL AFTER ASSEMBLY. DO NOT TAPE OVER EXPOSED CONTACTS.
4. BEFORE WRAPPING COILS, RIBBON CABLE, ITEM 7, MUST BE SQUARE WITH CARTRIDGE BODY, ITEM 5, ±1°.
5. THESE PINS NEED TO BE PROTECTED DURING HANDLING.

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DRFT	TCS	2-11-93
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LB	File Name: 104481	

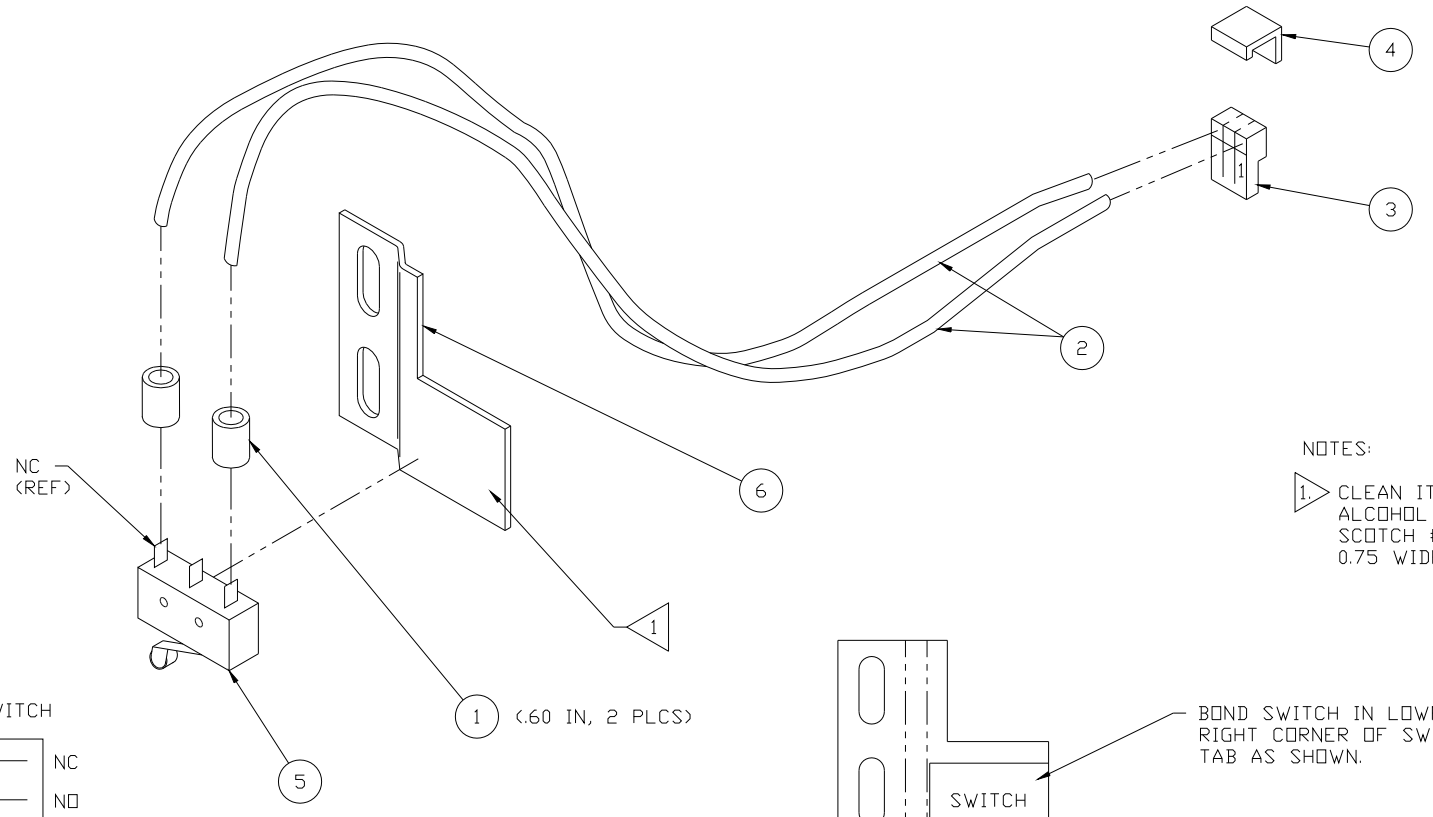
DRAWING NAME: CARTRIDGE ASSY, METAL

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .XX = ± .10 .XXX = ± .XXX
ANGLE = ± 1°
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
2	1 OF 1	104481

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50
103010	WIRE 22 GA ST WHT/BLK, TWIST,9 IN,	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50
102925	CONN, RECEPTACLE, IDC, 1 X 3, .1 SP	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50
102927	CONN, RECEPTACLE, COVER, 1 X 3, .1	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50
100295	SWITCH, SPST, MINIATURE	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50
102646	BRACKET, SWITCH, CHART HOLD LIMIT	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50
101369	HEATSHRINK, .125 DIA, BLK	102648	LIMIT SWITCH ASSY, CHART HOLD, LP50

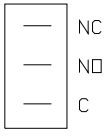
REV.	ECO:	REV DATE
1	CHG CONN, ITEM #3 REMOVED HSHRINK, CHG WIRE LG FROM 5.0 TO 8.0	4-7-90
2	CHANGED ORIENTATION OF ITEM 4, ZONE B2	4-26-90
3	CHANGED ITEM 3 TO THREE PIN CONNECTOR	5-16-90

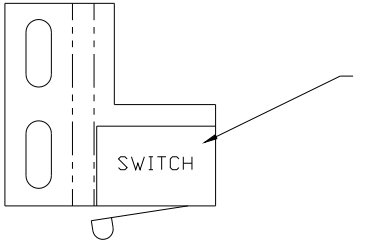


NOTES:

1. CLEAN ITEMS 5 AND 6 USING ISOPROPYL ALCOHOL PRIOR TO BONDING. BOND USING SCOTCH #4930 DOUBLE COATED TAPE, 0.75 WIDE X 0.40 LONG.

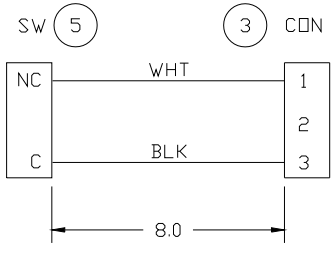
SWITCH





BOND SWITCH IN LOWER RIGHT CORNER OF SWITCH TAB AS SHOWN.

WIRE CONNECTIONS:



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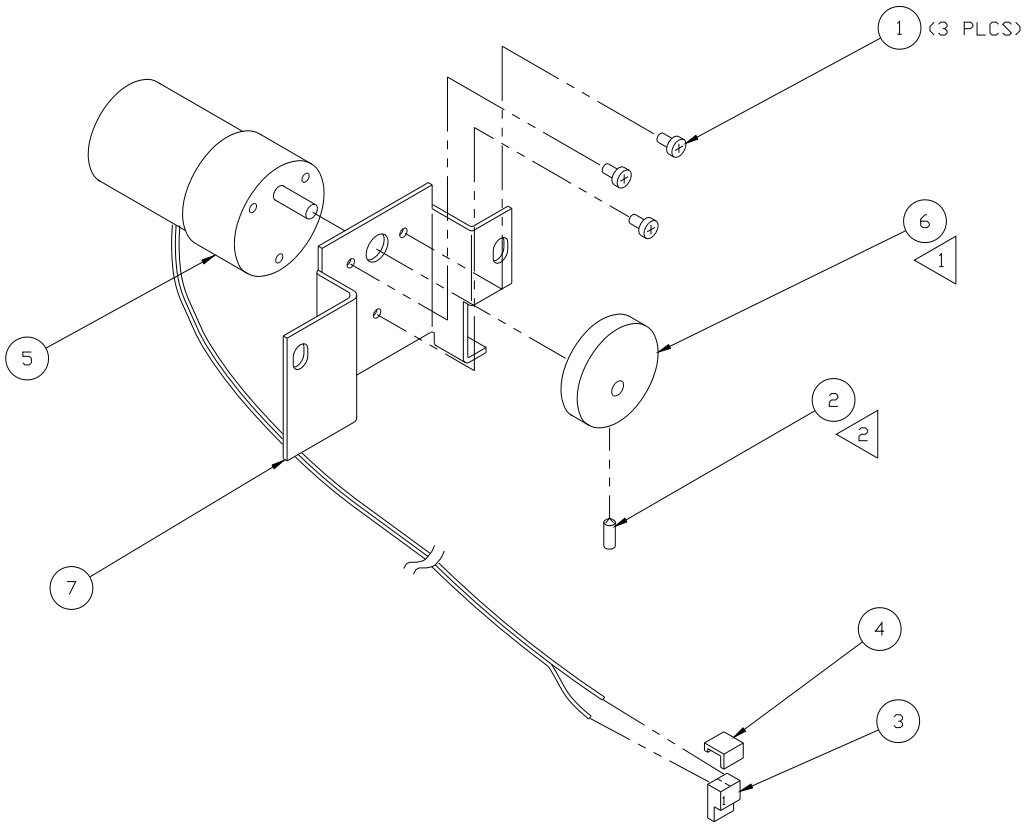
	By:	Date:
DRFT	CS	1-26-90
CHK		
ENGR		
MATL		
MFG		
QA		
File Name:	102648	

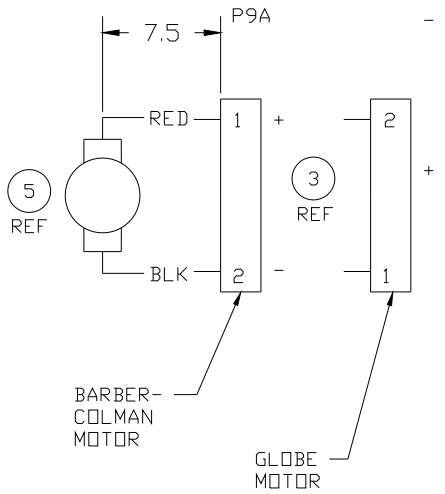
DRAWING NAME: LIMIT SWITCH ASSY, CHART HOLD, LP5000

UNLESS OTHERWISE SPECIFIED
Dim: INCHES Tol: .X = ±.1
.XX = ±.01
ANGLE = ±2° .XXX = ±.005
DO NOT SCALE TO DRAWING

REV.	Sheet No.	Dwg./Part No.:
3	1 OF 1	102648

REV	ZONE	DESCRIPTION	REV DATE
1		ECO 772	2-6-90
2		CHG CONN TYPE	4-7-90
3	A2	CHANGED ORIENTATION OF ITEM 4; ITEM 3 TO 2 PIN CONNECTOR.	4-26-90
6		ECO 956, 1055, 1482	2-12-91
8		ECO 1762, 2337	6-10-92
9	B2	ECO 2420: CHANGED ITEM 2 NOTE FROM 3 TO 2.	9-24-92
10	A4	2605 ITEM 2 WAS SET W/ LOCTITE 222.	3-17-93
11	B2	2630 ITEM 1 WAS 100012 AND SET W/ LOCTITE 222	4-7-93





NOTE:

1. INSTALL CAM ON SHAFT WITH .136±.020 (#29 DRILL) CLEARANCE BETWEEN MOUNT AND CAM.
2. SECURE ITEM 2 WITH LOCTITE ASSURE 425.

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DRFT	MPS	10-19-89
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	102420	

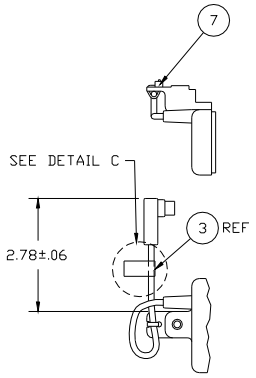
DRAWING NAME:
MOTOR ASSY, 5000
CHART HOLD CAM DRIVE

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .01
ANGLE = ± 2° .XXX = ± .005
DO NOT SCALE DRAWING

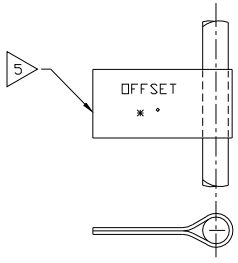
REV	Sheet No.	Drawing/Part No.
11	1 OF 1	102420

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103693	CUTTER ASSY, TANGENTIAL
103688	WIRING ASSY, FLAG SENSOR	103693	CUTTER ASSY, TANGENTIAL
103692	SHAFT ASSY, FLAG SENSOR	103693	CUTTER ASSY, TANGENTIAL
104103	THUMBSCREW	103693	CUTTER ASSY, TANGENTIAL
103436	HOUSING INSERT, CUTTER, TANGENTIAL	103693	CUTTER ASSY, TANGENTIAL
102773	BLADE, KNIFE, 45 DEG	103693	CUTTER ASSY, TANGENTIAL
103415	BLADE, TAN KNIFE, 45 DEG W/LABEL	103693	CUTTER ASSY, TANGENTIAL
104602	HOUSING, LEFT, ALUMINUM	103693	CUTTER ASSY, TANGENTIAL
104603	HOUSING, RIGHT, ALUMINUM	103693	CUTTER ASSY, TANGENTIAL
103852	RING, RETAINING, E-CLIP, 3/16	103693	CUTTER ASSY, TANGENTIAL
100017	SCREW #5-40, .125 LG, SH SET, CUP	103693	CUTTER ASSY, TANGENTIAL
103726	TYRAP, .1 IN X 3 IN, BLACK	103693	CUTTER ASSY, TANGENTIAL
102755	SCREW #4-40, .625 LG, SHC, BLK	103693	CUTTER ASSY, TANGENTIAL

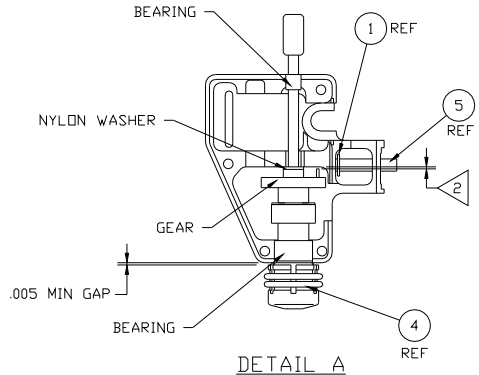
REV	ZONE	DESCRIPTION	REV DATE
3		1530 1564 1891	3-18-91
6		2069 2085 2272	5-4-92
7	A5	2626 ADDED DETAIL D	3-30-93
8	C7 B3	2668 THUMBSCREW, ITEM 5 WAS 103851	5-10-93
9		2803 REMOVE 103686 & 103851, ADD 104602, 104603, 100017, 102755	11-11-93
10	B3	4190 103415 WAS 102773 KNIFE BLADE	5-29-98



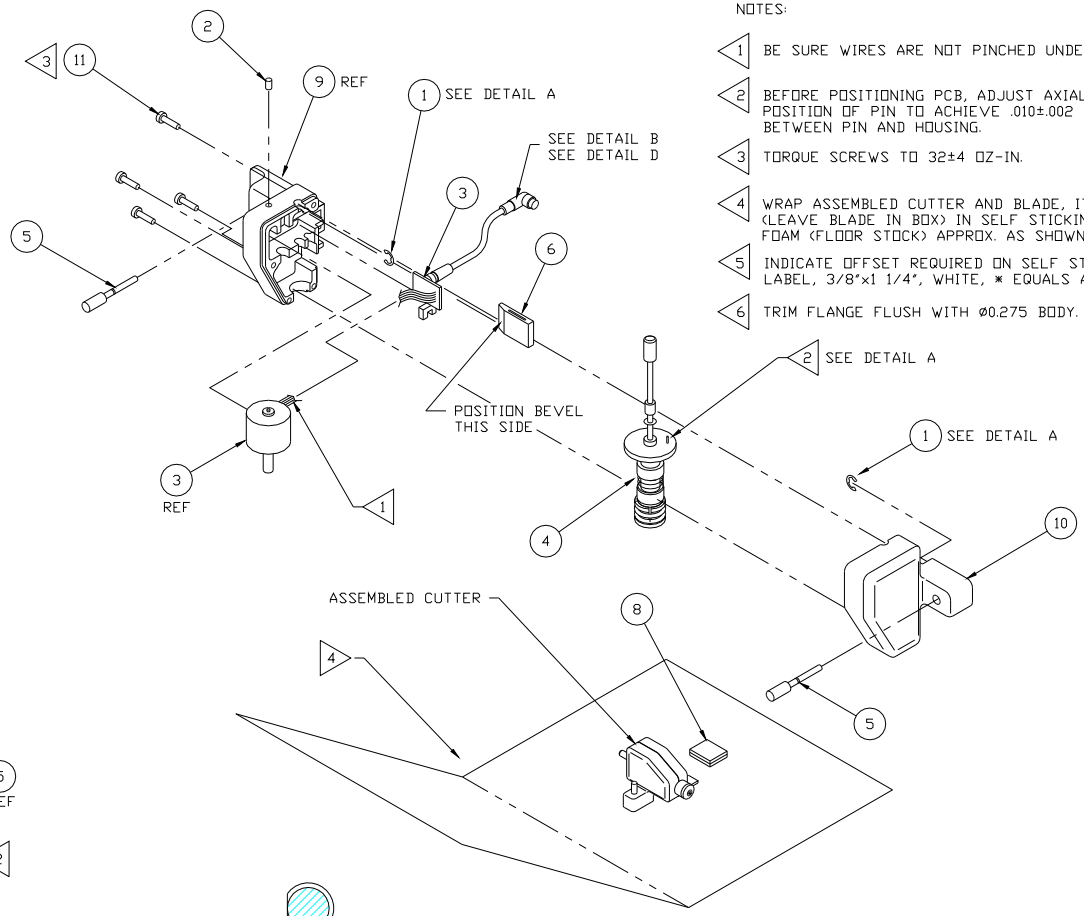
DETAIL B

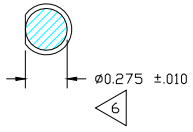


DETAIL C



DETAIL A





DETAIL D

NOTES:

1. BE SURE WIRES ARE NOT PINCHED UNDER MOTOR.
2. BEFORE POSITIONING PCB, ADJUST AXIAL POSITION OF PIN TO ACHIEVE .010±.002 GAP BETWEEN PIN AND HOUSING.
3. TORQUE SCREWS TO 32±4 OZ-IN.
4. WRAP ASSEMBLED CUTTER AND BLADE, ITEM 8, (LEAVE BLADE IN BOX) IN SELF STICKING FOAM (FLOOR STOCK) APPROX. AS SHOWN.
5. INDICATE OFFSET REQUIRED ON SELF STICKING LABEL, 3/8"x1 1/4", WHITE, * EQUALS ANGLE.
6. TRIM FLANGE FLUSH WITH Ø0.275 BODY.

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DRFT	TCS	2-8-91
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		

LB | File Name: 103693

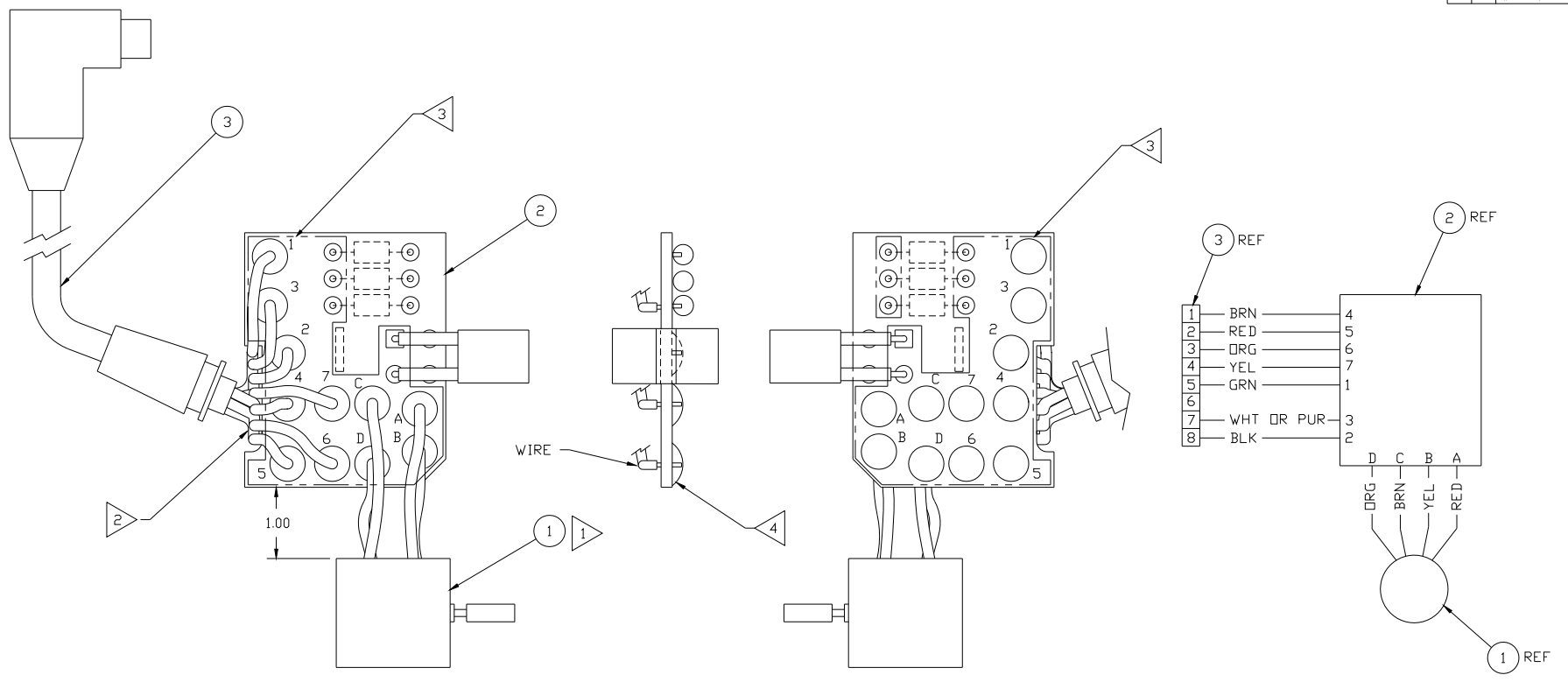
DRAWING NAME: CUTTER ASSY, TANGENTIAL

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
ANGLE = ± 2° .XX = ± .03
.XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
10	1 OF 1	103693

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103688	WIRING ASSY, FLAG SENSOR
103226	MOTOR ASSY, STEPPER	103688	WIRING ASSY, FLAG SENSOR
103687	PCB ASSY, CUTTER, FLAG SENSOR	103688	WIRING ASSY, FLAG SENSOR
102850	CABLE ASSY, 90 DEG MINI DIN, STRN R	103688	WIRING ASSY, FLAG SENSOR

REV	ZONE	DESCRIPTION	REV DATE
2		1988 2316	6-2-92
3	A4 A4 B2	.2814 DIM WAS .45 IS 1.00 CHANGE NOTE 1, ADD VIEW OF SOLDER SIDE OF PCB	10-25-93
4		2980 ADD MORE GLUING PROTECTION, REMOVE HEATSHRINK 102974	6-9-94
5	C2	3632 ADD ALTERNATE WIRE INSULATION COLOR	8-1-96



NOTES:

1. CUT BOTH BLACK WIRES TO APPROX .2 LENGTH FROM MOTOR. COVER BOTH WITH ONE .3 LENGTH HEATSHRINK.
2. NO HOT GLUE IN SLOT.
3. APPLY THIN LAYER OF HOT GLUE IN AREA INDICATED BY PHANTOM LINE.
4. COVER EXPOSED COMPONENT LEADS WITH HOT GLUE.

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DRFT	TCS	2-8-91
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LB	File Name: 103688	

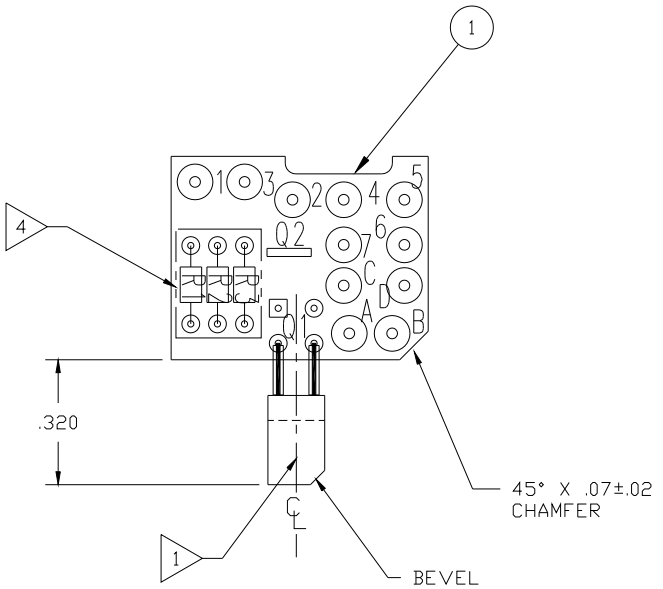
DRAWING NAME: WIRING ASSY, FLAG SENSOR

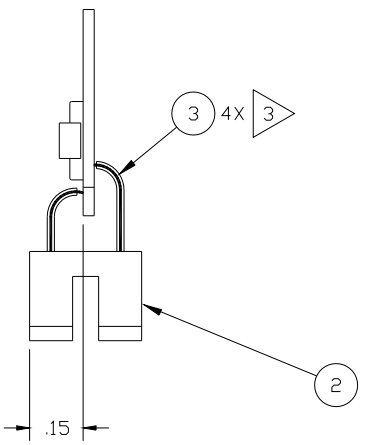
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
ANGLE = ± ° .XX = ± .05
.XXX = ±
DO NOT SCALE DRAWING

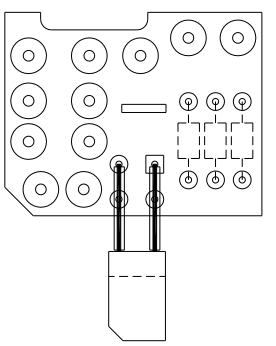
REV	Sheet No.	Drawing/Part No.
5	1 OF 1	103688

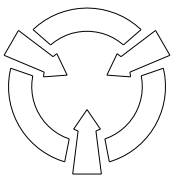
COMPONENT	COMP_DESC	PARENT	PARNT_DESC
103935	ZIPLOCK BAG, STATIC, 6 X 8	103687	PCB ASSY, CUTTER, FLAG SENSOR
103809	TRANSISTOR, MMBT2222A, SOT-23	103687	PCB ASSY, CUTTER, FLAG SENSOR
102790	RES, 390 OHM, 5%, 1/8 W	103687	PCB ASSY, CUTTER, FLAG SENSOR
102792	RES, 1K OHM, 5%, 1/8W	103687	PCB ASSY, CUTTER, FLAG SENSOR
103231	RES, 20K OHM, 5%, 1/4W	103687	PCB ASSY, CUTTER, FLAG SENSOR
103785	PCB, CUTTER SENSOR	103687	PCB ASSY, CUTTER, FLAG SENSOR
103684	SENSOR, FLAG	103687	PCB ASSY, CUTTER, FLAG SENSOR
102974	HEATSHRINK, .093 DIA, CLEAR	103687	PCB ASSY, CUTTER, FLAG SENSOR

REV	ZONE	DESCRIPTION	REV DATE
4		1588 1958 2077 2093	12-3-91
5	B4	2745 DIM WAS .31 IS .350	7-9-93
6	B2	2979 ADDED HEATSHRINK ITEM 3, AND NOTE 3	6-8-94
7	B4	3041 DIM WAS .350 IS .320	7-22-94
8	A4	4723 ADD FLAG NOTE 4	1-25-00









CAUTION

SENSITIVE ELECTRONIC DEVICES

DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, ELECTROMAGNETIC, MAGNETIC OR RADIOACTIVE FIELDS

NOTES:

1. ALIGN ℄ OF SENSOR WITH ℄ OF 4 HOLE PATTERN AT Q1, WITH BEVEL LOCATED AS SHOWN.

2. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG. PART MARK OUTSIDE OF STATIC BAG WITH PART NUMBER AN REV LEVEL, PART NUMBER AND REV LEVEL TO REFLECT THIS DRAWING.

3. SENSOR LEADS MUST BE FULLY COVERED BY HEATSHRINK.

4. MOUNT RESISTORS R1, R2, R3 FLUSH TO PCB.

-	-	-	-	-	0	8	REV	REV STATUS OF SHEETS
7	6	5	4	3	2	1	SHEET	

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DRFT	TCS	2-12-91
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103687	

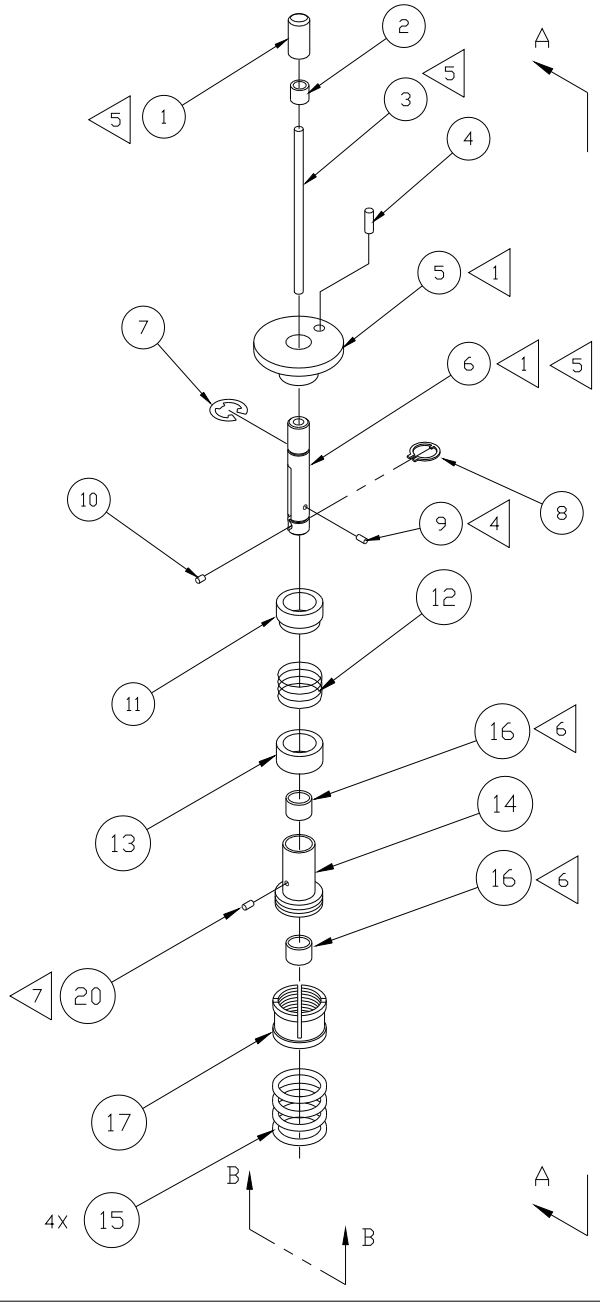
DRAWING NAME: PCB ASSY, FLAG SENSOR

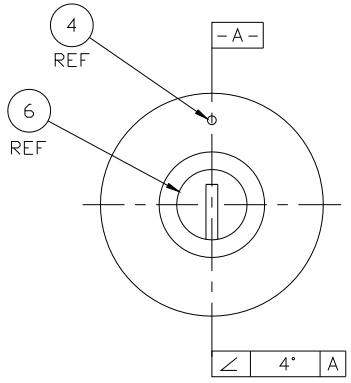
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 1° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
8	1 OF 2	103687

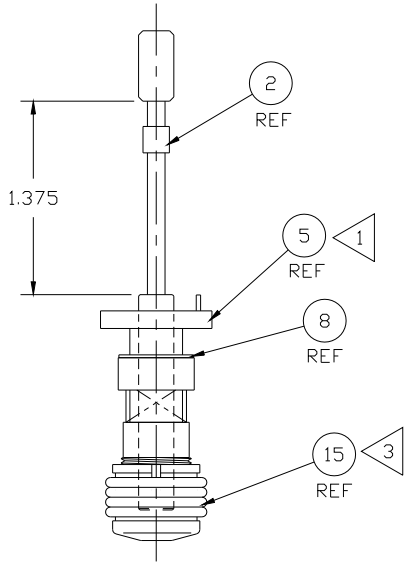
COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103692	SHAFT ASSY, FLAG SENSOR
102777	THUMB KNOB	103692	SHAFT ASSY, FLAG SENSOR
102759	BEARING, DU, .125ID, .188LG	103692	SHAFT ASSY, FLAG SENSOR
103368	SHAFT, .125 OD X 1.87 LG	103692	SHAFT ASSY, FLAG SENSOR
103681	PIN, DOWEL, .0313 OD X .250 LG SS	103692	SHAFT ASSY, FLAG SENSOR
103697	GEAR, MOD, 36T, FLAG SENSOR	103692	SHAFT ASSY, FLAG SENSOR
103698	SHAFT, FLAG SENSOR	103692	SHAFT ASSY, FLAG SENSOR
103030	PIN, DOWEL, .0626 OD, .156 LG	103692	SHAFT ASSY, FLAG SENSOR
103690	SPRING HOLDER	103692	SHAFT ASSY, FLAG SENSOR
102768	SPRING, .43 OD, .59 LG	103692	SHAFT ASSY, FLAG SENSOR
102761	BEARING, DU, .375ID, .250LG	103692	SHAFT ASSY, FLAG SENSOR
103689	INNER SLEEVE, FLAG SENSOR	103692	SHAFT ASSY, FLAG SENSOR
100126	O-RING, .364 ID X .070	103692	SHAFT ASSY, FLAG SENSOR
103655	O-RING, .426 ID X .070	103692	SHAFT ASSY, FLAG SENSOR
102760	BEARING, DU, .250ID, .250LG	103692	SHAFT ASSY, FLAG SENSOR
103727	FOOT, CUTTER	103692	SHAFT ASSY, FLAG SENSOR
104041	FOOT, CUTTER	103692	SHAFT ASSY, FLAG SENSOR
103496	PIN, DOWEL, .0312 OD, .125 LG	103692	SHAFT ASSY, FLAG SENSOR
102222	RING, RETAINING, E-CLIP, 1/4	103692	SHAFT ASSY, FLAG SENSOR
100332	RING, RETAINING, 1/4IN.	103692	SHAFT ASSY, FLAG SENSOR
102758	SCREW #4-40, .094 LG, SH SET, CUP	103692	SHAFT ASSY, FLAG SENSOR
102861	WSHR, .250D, .12ID, .032THK, NYLON	103692	SHAFT ASSY, FLAG SENSOR

REV	ZONE	DESCRIPTION	REV DATE
4		1542 1612 1622 1644	4-23-91
6		1877 2069	11-18-91
7	A4	2668 FOOT, ITEM 17, WAS 103727	5-10-93
8	A4	2714 O-RING, ITEM 15, WAS 100126	6-9-93
9	B4	3040 REMOVE WASHER, ITEM 19, P/N 102861	7-22-94
10	B2	3850 CHANGE NOTE 1	3-31-97





VIEW B-B



VIEW A-A

NOTES:

1. PUT ONE DROP OF BLACK MAX INSIDE GEAR BORE, ITEM 5, BEFORE INSTALLING ON FLAG SENSOR SHAFT, ITEM 6. PRESS GEAR ONTO SHAFT UNTIL SEATED AGAINST E-CLIP, ITEM 8. THESE THREE PARTS ARE TO BE ASSEMBLED SEPARATE AND THE BLACK MAX FULLY CURED BEFORE CONTINUING WITH REMAINING ASSEMBLY PROCESS.
3. TO PREVENT DAMAGE TO BLADE, ADJUST POSITION OF SLEEVE SO THAT TIP OF BLADE IS FULLY RECESSED.
4. ENDS OF PIN, ITEM 9, MUST BE FLUSH OR BELOW SURFACE OF SHAFT, ITEM 6.
5. FASTEN PIN, ITEM 3, TO ITEMS 1 AND 6 USING LOCTITE 609. CLEAN INTERFACE WITH ALCOHOL PRIOR TO BONDING.
6. BEARINGS, ITEM 16, TO BE FLUSH WITH ENDS OF SLEEVE, ITEM 14.
7. END OF DOWEL PIN, ITEM 20, TO BE FLUSH WITH OUTSIDE SURFACE OF SLEEVE, ITEM 14.

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DRFT	TCS	2-8-91
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103692	

DRAWING NAME: SHAFT ASSY, FLAG SENSOR

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ± .01
ANGLE = ± ° .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
10	1 OF 1	103692